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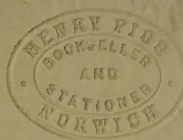
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STRUCTURE, DISEASES, AND INJURIES

OF THE

BLOOD-VESSELS.

“ La méthode la plus sûre qui puisse nous guider dans la recherche de la vérité, consiste à s'élever, par induction, des phénomènes aux lois, et des lois aux forces.”

LAPLACE—*Essai Philosophique sur les Probabilités.*

APPENDIX
TO
THE TREATISE
ON THE
STRUCTURE, DISEASES, AND INJURIES
OF
THE BLOOD-VESSELS.

WITH STATISTICAL DEDUCTIONS.

BEING

THE ESSAY TO WHICH THE JACKSONIAN PRIZE FOR THE YEAR 1844 WAS AWARDED
BY THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

BY

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HOSPITAL; AND ONE OF THE VICE-PRESIDENTS OF THE SOUTH
LONDON MEDICAL SOCIETY.

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PREFACE TO THE PRIZE ESSAY.

THE subject selected by the Council of the Royal College of Surgeons of England, for the Jacksonian Prize, viz., "The Structure and Diseases of the Larger Blood-vessels," is one of vast importance, and requiring the most careful and rigid investigation.

According to the Report of the Registrar-General for 1840,¹ only one hundred and forty-seven persons died from aneurismal diseases in England and Wales; whilst nearly four thousand sudden deaths were not accounted for, the greater number of these being attributed to apoplexy—a disease, which is in fact, rarely, if ever, suddenly fatal, unless it arise from rupture of the basilar artery, only three instances of which the author has met with, one of them occurring in his own practice.

When the indirect influence of diseases of the blood-vessels, and the effects of their various chronic lesions, upon the duration of life are considered, the subject becomes one of immense interest; so necessary is a healthy state of the circulatory apparatus to the performance of the different functions of the body, that it would be difficult to name a disease that is not more or less influenced by its abnormal condition.

The Author has for many years paid much attention to this class of diseases, and his residence in the neighbourhood of two large hospitals, has afforded him many opportunities of witnessing operations, and watching the progress of these af-

¹ This was written in 1844. In 1846 fifty-two deaths occurred in the metropolis from aneurism.

fections ; he, however, approaches the task he has undertaken with diffidence, and although he has occasion to disagree on many points with men, deservedly of high repute, he trusts that his conclusions will be sufficiently warranted by facts to prevent his being charged with presumption.

The Table of Aneurisms is the largest yet published, and is formed by impartially taking all the cases from the British Medical Journals : the great majority of them are reported by the practitioner in attendance. Many are necessarily imperfect ; but still it is thought, that, with so large a mass of evidence, the deductions must in the main be correct. The number of cases might have been greatly increased by adding examples from the Foreign Journals ; but the object has been exclusively to form a record of the published cases occurring in this country during the last half century. The operations are only reported as successful when a sufficient time has elapsed to warrant such an inference. The author is aware that deductions from this part of the evidence are not always to be relied on ; as successful operations are too often brought before the public, while those which terminate fatally remain unpublished.

In his allusion to unsuccessful cases, the author wishes it to be understood, that in no one instance does he intend to impute the slightest blame to the practitioner in attendance.

WALWORTH, *Dec. 23d*, 1844.

PREFACE.

It will be seen by the foregoing preface, that the subject of the original treatise was—"The Structure and Diseases of the Larger Blood-vessels." More than two years having elapsed since the Prize Essay was written, I have been enabled, by personal observation, and the recorded experience of others, to obtain much additional information. I have likewise taken a more comprehensive view of the matter, and treated of diseases and injuries of the blood-vessels generally; and by this means the work has been so much enlarged, that I think it due to the adjudicators to state that they are not in any way responsible for any errors which may have occurred in the introduction of additional matter.

Many of the subjects touched upon are well known to be of so speculative a character, that they must, doubtless, give rise to much difference of opinion; I have, however, throughout, more especially in the structural and pathological conditions of the blood-vessels, given the result of my own observation, and have not drawn my inferences without careful investigation.

It has long been my opinion, that the statistical is the only sure method of arriving at accurate deductions in medical inquiries; a system I have before adopted in my papers on Gall-Stones and Perforations of the Stomach.¹ That many objections may be urged against this mode of inquiry, particularly in therapeutical investigations, I am ready to admit; but in some pathological researches, a degree of accuracy may be arrived at, which must render the deductions almost indis-

¹ Lancet, Nos. 954, 1040.

putable ; and this remark applies, I think, in an especial manner to aneurism.

The Table of Aneurisms, as I have before stated, may contain a few inaccuracies ; but these, it is presumed, would not materially affect the conclusions. I might have contented myself by giving the deductions without publishing the Table, but had this plan been pursued, errors might not so easily have been detected ; and hence it would have been difficult to form a correct estimate of the value of the inferences.

It has already been remarked, that the number of examples might have been greatly multiplied if cases had been inserted from the foreign journals. I have avoided this for two reasons—first, because I think the Table¹ sufficiently large for the purpose of useful deduction ; and, secondly, because the different modes of operating adopted by some continental surgeons, as well as the influence of climate, as regards the operation for aneurism, might invalidate my conclusions.

In the composition of this treatise, my sole object has been the elucidation of truth. I have had no preconceived opinions to substantiate, no theories to support, and however imperfect the style of the Essay may be considered, I trust that I shall at least have credit for impartiality.

The Prize Essay was illustrated by twenty-one specimens, which, with four exceptions, were prepared by myself. From these and others in my own collection, most of the drawings were taken.

I must, in conclusion, express my great obligations to the numerous friends who have so kindly and so readily assisted me in my inquiries.

BETHEL PLACE, CAMBERWELL ;

March 1st, 1847.

¹ I have perused all the cases myself, and am therefore answerable for any errors that may have occurred. Whenever a case has been imperfectly recorded, I have endeavoured to obtain the result from the practitioner who attended the patient.

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ERRATA.

Page 5, line 16, <i>for this read the.</i>	Page 133, line 32, <i>for left pleura read pleuræ.</i>
25, 14, <i>for of read to.</i>	143, 19, <i>for to within the same distance, read to the origin of.</i>
34, 33, <i>for existing read exciting.</i>	154, 25, <i>for before read above.</i>
47, 24, <i>for antimonial powder half a grain read five grains.</i>	168, 8, <i>for lamina read laminae.</i>
57, 4, <i>for and read at.</i>	189, 14, <i>for diagnosis read prognosis.</i>
86, 33, <i>"and left" to be omitted.</i>	324, 29, <i>for increased read decreased.</i>

STRUCTURE AND DISEASES OF THE BLOOD-VESSELS.

CHAPTER I.

STRUCTURE OF ARTERIES AND VEINS.

BEFORE proceeding to the diseases of the arteries and veins, it will be well to give a brief description of their structure.

Much difference of opinion exists respecting the structure of arteries, and the number of coats assigned to them varies from three to six : the usual division of the older anatomists was into three, viz.—the external, or cellular ; the middle, or fibrous ; and the internal, or serous. Henlé¹ has increased the number to six, viz.—the epithelial ; the fenestrated, or striated ; the longitudinal, or granular (this only seen in some arteries) ; the fibrous tunic of the older anatomists ; the “tissue jaune” of the French writers ; and the external, or cellular.

After a very careful examination of a great number of arteries, both healthy and diseased, taken from subjects of various ages, I have only been able to recognize four coats : 1st, the internal, or serous ; 2d, the subserous, or tunica cellulosa of Haller, or sclerous of Malgaigne ; 3d, the fibrous ; and 4th, the cellular. It is questionable whether the epithelial lining, if it exists, can be considered to constitute a distinct coat ; epithelial scales are constantly reforming, and unless we suppose them to be immediately dissolved by the liquor sanguinis, their debris would tend to obstruct the capillary vessels.

¹ Paget's Retrospect, 1844.

Although I have repeatedly examined the coats of the arteries and veins under the microscope, my experience in the use of this instrument has not been sufficiently extensive to entitle my opinion to much weight. I cannot, however, help expressing my belief, that up the present time, the microscope has assisted us but little in clearing up the many disputed points respecting the structure of the arteries. Thus, I am told by two experienced microscopists, that muscular fibres can be distinctly recognized in some arteries, whilst a third gentleman, whose opportunities of judging have been quite as great, tells me that he has never been able to discover them.

The serous coat is a fine, delicate, transparent membrane, of great tenuity and fragility. It has a smooth, polished, lubricated surface, and resembles the arachnoid in appearance; it is continued from the ventricles of the heart, and by its duplication it assists in forming the semilunar valves of the aorta and pulmonary artery; it is supposed to be a shut sac, and like the other serous membranes in a healthy state, it contains no red blood. Some writers assert, that vessels containing red blood, have been seen in it when in an inflammatory condition. I have frequently seen this membrane of a bright yellow colour in jaundiced subjects: but in animals which I have fed upon madder its colour has remained unaltered.

The subserous coat is a hard, brittle membrane, situated between the fibrous and serous coats; it is opaque, and of a whitish colour, and varies in thickness according to the age of the individual. In the young it is much less distinct than in the middle aged; more dense in the apoplectic and those affected with hypertrophy of the left ventricle; less perceptible in the arteries of females; and in children I have not been able to detect it. The fibres of the membrane pass in an oblique or longitudinal direction, and may be distinctly recognized (plate II, fig. 5) on the arch and ascending portion of the aorta; the membrane diminishes in thickness as the artery decreases in size; and I believe that the adventitious deposits are seated principally, if not invariably, in this tunic.

The fibrous or elastic coat is composed of firm circular

fibres : these may be divided into several layers ; they are of a flattened form, and of a pale yellowish colour. Their direction is generally transverse ; their length has been variously estimated by different anatomists. Velpeau, Quain, and others state that they are rather oblique in their course. According to Lisfranc and Malgaigne, they run in a spiral direction, and may be traced two or three times round the vessel ; while others describe them as forming perfect circles. I have frequently examined these fibres with great care, but I have never succeeded in following them completely round the vessel. In some parts, as in the ascending aorta, they take an oblique direction. This is well seen in plate II, fig. 4, which shows the course of the fibres above the tricuspid valves of the pulmonary artery ; in the straight arteries, they appear to be entirely transverse. When a small branch is given off from the aorta, or any of the larger vessels, these fibres appear to separate, leaving an opening of an oval form. At the bifurcation of the common iliacs, the fibres take an oblique course, a raphé existing at the posterior part of the vessel (plate II, fig. 2.) This coat, like the two former, is easily divided by ligature. I have never detected any deposits in it ; and although in many dried specimens, where the arteries are converted into bony cylinders, the ossified matter appears to be seated in this tunic, I believe a careful inspection will show that the deposits are really in the subserous membrane.

The cellular or external coat is formed of fibres crossing each other in various directions, is firmly attached to the fibrous tunic, and here it becomes more dense ; it is connected with the sheath of the artery by delicate fibrillæ. This membrane is capable of much distension, possesses great power of resistance, and is so tough that a ligature, forcibly applied, does not divide it, as will be seen hereafter, when speaking of the ligature of arteries.

In addition to the four coats already described, the arteries are surrounded by a sheath composed of loose cellular tissue, so as to allow of their free motion, as well as of retraction, in case of division. In the extremities, where they are more exposed to violence, this tissue is denser than in the chest and abdomen, where it is very loose and thin. The sheath ge-

nerally contains a vein as well as an artery, and sometimes nerves.

The arteries are principally supplied with blood from the neighbouring vessels, and these branches are called vasa vasorum. When injected and viewed through the microscope, they may be seen ramifying between the two outer coats, (plate II, fig. 6,) some of them appearing to penetrate the fibrous coat; the nerves and absorbents can only be traced into this tunic. The thoracic and abdominal arteries, are principally furnished with nerves by the sympathetic ganglia; the cerebro-spinal system supplies the arteries of the extremities; but we have yet much to learn respecting the exact distribution of these nerves, as well as their influence upon the circulation.

The only valves in the arterial system are those situated at the commencement of the aorta and pulmonary artery. They are formed by duplicatures of the serous lining, having a fibrous layer between, which is thicker at the bases and margins.

To these observations on the structural anatomy of the arteries and veins, I am desirous of adding a few remarks. For all practical purposes, perhaps, the common division into three coats is sufficient; but I think it is scarcely possible to dissect carefully the aorta, and its larger branches, without coming to the conclusion, that the subserous layer is a distinct tunic, and not, as described by many anatomists, a part of the serous.

It would be out of place in this treatise to bring forward the various arguments respecting the muscularity or non-muscularity of the arteries. Most anatomists now believe, in opposition to the opinions of John Hunter, Söemmering, Thompson, and other celebrated physiologists, in their non-muscularity; and I confess that, in my dissections of the arteries of man and of those of the inferior animals, I have never been able to detect any structure resembling muscular fibre; indeed, the result of my own observations is at direct variance with such an hypothesis.

The fibrous coat of the arteries, when examined after death, possesses both extensibility and contractility, in a high degree, neither of which properties appertain to dead muscular fibre. The increased throbbing in whitlow and other local affec-

tions, affords an argument which has been frequently used in favour of their muscularity. This phenomenon, I think, admits of a very easy explanation. In inflammation, the blood, in many of the capillary vessels, is obstructed in its course, and the *vis a tergo* produced by the contraction of the left ventricle, as well as by the elasticity of the arterial tunics, being the same in all the branches, it naturally follows that the arteries on the cardiac side of the obstruction should be more distended. A good example of this is seen in the throbbing arteries of a stump after amputation.

The prevailing opinion, that more blood passes through an inflamed part, I believe to be erroneous. John Hunter, in his work on the Blood, has related several experiments performed on dead arteries which he thought tended to show that they possess the power of muscular contraction. I confess that I am unable to draw this same inference from these investigations.

I have performed numerous experiments upon the arteries of man and the inferior animals, for the purpose of ascertaining the amount of physical elasticity which they possess; the particulars I subjoin.

The arteries were extended upon a board by means of pins, and covered with a moist cloth. They were taken from subjects under forty years of age.

Experiment 1. Twelve inches and a quarter of the aorta (from the arch to the bifurcation) were extended to eighteen inches; after twenty hours the pins were removed, the tube resumed its former length.

Ex. 2. A transverse slip of the same artery, two inches in length, was extended to two inches, eleven lines; after several hours (on removing the pins) it contracted to two inches.

Ex. 3. Four inches of the abdominal aorta of a child, two years of age, after twenty hours' extension, contracted to four inches and one third.

Ex. 4. Four inches and three fourths of the abdominal aorta of a man of seventy-nine years of age, could be extended only to five inches.

Ex. 5. Seven inches of an ossified femoral artery, extended to eight inches, on removing the pins, after twenty hours, contracted but very slightly.

Ex. 6. A transverse slip of the pulmonary artery, two inches and a half long, after twenty-four hours, resumed its original length.

Ex. 7. Five inches four lines of the internal mammary, extended to six inches; after twenty-four hours very slight contraction was observed.

Ex. 8. Three inches of the vena cava inferior, extended to four inches, after twenty-four hours, contracted to three inches and a half.

Ex. 9. Thirteen inches of the aorta of a horse, extended to nineteen inches, and kept moist for a fortnight; on removing the nails it contracted to fifteen inches and a quarter.

Ex. 10. A section of the upper part of the thoracic aorta of an ox, two inches five lines in circumference (inside measurement), was extended on a cylinder of wood to five inches five lines; after twenty-four hours it contracted to its former size.

Ex. 11. A circular piece of the same artery, three inches in length, with the yellow tissue nearly removed, extended to five inches and three fourths, contracted, after twenty-four hours, to its original dimensions.

Ex. 12. Eleven inches of the carotid artery and jugular vein of an ox were elongated to nineteen inches and a half; after twenty-four hours, the vein had increased an inch in length: the artery measured the same as before.

Ex. 13. Three inches and a half of the ligamentum nuchæ of a sheep, elongated to four and a half inches, after twenty-four hours resumed its former length.

These experiments have been repeated in various ways on the arteries of different animals, and the following are the conclusions arrived at:

First. That the fibrous coat of the arteries and veins is highly elastic; that it possesses no properties analogous to muscular fibre; that this tissue differs from all other structures of the body (excepting the ligamentum nuchæ and ligamentum subflavum) as regards its amount of elasticity.

Secondly. That the elastic property is the same in every part of the fibrous coat of the larger arteries.

Thirdly. That the arteries of women are rather more elastic than those of men; and that the elastic property generally diminishes after the age of forty-five or fifty.

Fourthly. That the elasticity of an artery decreases with its size.

Fifthly. That the veins are, in a slight degree, less elastic than the arteries.

Lastly. That the cellular coat of an artery possesses but little, if any, physical elasticity.

The veins are composed of three coats; and, unlike the arteries, many of them are furnished with valves:—these, as in the arteries, are formed by the duplicature of the lining membrane; they are usually two in number, occasionally single, and sometimes tricuspid. Their margins are straighter than those of the aorta and pulmonary artery. The valves are most abundant in the veins of the lower extremities: they are sometimes found in the external iliacs, but are absent in the cavæ, as well as in the veins of the liver, spleen, lungs, and brain. The inner or serous coat of the veins is more dense than that of the arteries; it is also tougher and not so lacerable, and a ligature tightly applied does not divide it. The fibres of the middle coat of the veins, have more the appearance of muscular structure than those of the arteries, and seem to pass in a longitudinal direction, both in the external and internal veins of the trunk and extremities. I have never been able to detect circular fibres in any of the veins, although they have been described by some anatomists. If a vein is extended and held up to the light, the fibres of the cellular coat are seen ramifying in various directions, and, if these are not very carefully examined, they may readily be confounded with those of the fibrous coat, which is much thinner and capable of greater distension than the corresponding arterial tunic: it is also more vascular than the fibrous coat of the arteries. The cellular coat is composed (as in the arteries) of reticulated cellular membrane, which loosely envelopes the middle coat.

These coats are united by fine cellular tissue; but the sub-serous coat is not found in the veins. Blood-vessels, nerves, and absorbents can be traced into the middle coat.

CHAPTER II.

MORBID CONDITIONS OF ARTERIES.

IN investigating the morbid conditions of the arteries, it must be borne in mind that they have not only a structural peculiarity, but that their lining membrane is constantly washed by the blood, and that the deposits of coagulable lymph so common in other serous structures are comparatively rare in these. Reasoning from analogy, it is also probable that a larger quantity of serum is poured out from the inner tunics when in an inflammatory state; but the foregoing points are of too speculative a character to merit much attention, and I will pass on to a question of more practical import, viz. How are the different forms of redness to be distinguished? It appears to me that the matter may be materially simplified by dividing these discolorations into the inflammatory, the congestive, and what has been called redness from imbibition. The first is characterized by appearances hereafter to be described, and I believe when these are present, we may rightly infer the existence of inflammation. The congestive discoloration is in many instances difficult to distinguish from the inflammatory; but the state of the blood, as well as the turgid condition of other parts, especially the membranous tissues, will greatly assist us in coming to a correct conclusion. Thus in cases where the blood is found fluid after death, or where it is deficient in fibrine, and its colouring matter perhaps altered, these congestions are not unfrequent. Andral met with this state of artery in several patients, who died of adynamic fever; although in a very severe case of petechial fever (Table of Arteries 53), in which there were large black spots on the skin, the tongue brown, and the teeth covered with sordes, I found all the large arteries normal in appearance.

In the example of pericarditis (59) the descending thoracic

aorta only was intensely red, all the thoracic and abdominal viscera being in a congested state. Some writers believe that the congestive or inflammatory condition is frequent in granular disease of the kidneys. In the table of one hundred cases by Drs. Bright and Barlow in the Guy's Hospital Reports, this appearance is not mentioned; I learn, however, from Dr. Barlow, that the aorta in the majority was not carefully examined. In the table five cases of this disease are reported (9, 23, 32, 33, and 96), in three redness existed; in the others the colour was natural. Louis,¹ in his work on Phthisis, p. 52, says, "The aorta was perfectly healthy in the majority of cases, and of a more or less bright red colour, either generally or over a limited extent of surface, in one fourth part of my cases. This redness penetrated more or less deeply into the substance of the middle tunic, and affected the entire circumference of the vessel, whether it contained a little blood or none at all; so that it could not in all cases be considered an effect of imbibition."

The sudden deaths, unless accompanied by violence to the artery (as in case 22) are not attended with discoloration. In a case of poisoning by arsenic (15) no redness was present; and from the examinations I have made of the lower animals destroyed by arsenic, opium, and prussic acid, I have reason to believe that the arteries are not perceptibly changed by these poisons.

Some pathologists have classed what I have called the congestive form of redness under the head of inflammation, whilst others have attributed it to imbibition by the tissues after death. I think we are fully warranted in assuming that a congestive state of the artery exists in many cases, and that this condition, as in other organs, may run into the inflammatory. I admit, however, that the question is beset with difficulties, and whilst the boundary between inflammation and congestion remains undefined, and our knowledge of the essential characteristics of the former doubtful, we can scarcely hope that the conflicting opinions which are at present entertained can be reconciled.

The exact nature of the last-mentioned change, redness from

¹ Walshe's translation.

imbibition, is also but little understood; thus, it is generally believed to be a post-mortem effect from the imbibition or absorption of the blood which is in contact with the lining membrane of the artery. I believe the best distinguishing mark between this and the foregoing discolorations is the absence of the soft pulpy state of the inner coats, as well as the facility with which redness is removed by immersion in water. I have repeatedly produced this discoloration of the inner coats, by placing an artery in recently drawn blood, but the dye has soon disappeared after washing and immersion in water; whereas in the congestive and inflammatory reddening the colour remains for several days, and in some specimens it is permanent. I have no doubt but that the greater number of discolorations arise from this cause, although it is difficult in many instances to account for the partial reddening which takes place. I have sometimes seen a dark riband-like stain in the posterior part of the aorta where the blood had gravitated, but in other inspections the discoloured portion has been seated in the anterior part of the ascending aorta where the fluid appeared not to be in contact with the parietes of the vessel. In some instances these discolorations have a patchy appearance, the intervening portions of the artery retaining their natural colour.

During the last two years I have examined the large arteries of the chest and abdomen in the following cases, some of them occurring in my own practice, others in that of my friends, and the remainder at St. Thomas's Hospital; the former are marked with an asterisk. In the great majority, the heart and valves have been also inspected: when these as well as the iliacs and arteries from the arch are not noticed, they have been found healthy, or but slightly diseased. In addition to the annexed cases the arteries of several children have been examined, but they were invariably normal. Previous to the period alluded to I had frequently inspected the arteries, but unfortunately no notes were taken of their appearances. The cases are not at present sufficiently numerous for statistical inference, but they serve to show the diversity of morbid changes that may exist in different diseases, as well as the great difficulty in the present state of our knowledge of accounting for them. The examinations were generally instituted within twenty-four hours

of death, and the descriptions written at the time of, or soon after the autopsies. The month is only mentioned when the changes observed might have been induced by variation of temperature.

Although the arteries are generally said to be empty after death, it will be found that the large arteries frequently contain soft coagula, and sometimes blood in a fluid state. I have frequently applied two ligatures to the external iliac artery, and punctured the vessel under water, but air bubbles escaped in one instance only (Case 70). In a man also who died of poisoning by prussic acid, I found the coronary artery of the stomach distended with air; both the bodies were in an advanced stage of decomposition.

TABLE.

1. Male, æt. 20. **Emphysema of the lungs*.—Small spots of atheromatous deposit under the inner membrane, along the orifices of the intercostal arteries: no redness. Examination 20 h. p. m.; blood fluid.

2. Female, æt. 5. **Congestive form of scarlatina*.—Aorta healthy in every part and natural in colour.

3. F. 26. *Malignant ulceration of the os uteri and upper part of the vagina. Repeated hemorrhage*.—Slight atheromatous deposit under the lining membrane of the aorta.

4. F. 18. *Scarlatina with pericarditis and pneumonia*.—Atheromatous deposit along the course of the intercostal arteries, confined to this part. The patches linear and corresponding with the long axis of the artery.

5. M. 17. *Fever*.—A few small atheromatous deposits at the arch of the aorta.

6. M. 64. **Apoplexy*.—Patches of atheromatous and bony deposit, with considerable thickening of the fibrous coat. Hypertrophy of the left ventricle.

7. M. 35. *Phthisis*.—Atheromatous deposit along the origins of the intercostal arteries, principally confined to this part.

8. M. 68. *Cancer of the axilla*.—Extensive bony and atheromatous deposit in all the large arteries.

9. F. 45. *Bright's disease of the kidney; diseased heart, with general anasarca*.—Bony and atheromatous deposit in various

parts of the aorta; the coats of the artery considerably reddened by imbibition.

10. M. 69. *Fracture of tibia and fibula in two places; leg amputated; no visceral disease; death from exhaustion.*—The lining membrane of the thoracic and abdominal aorta intensely reddened throughout; the inner and subserous coats having a puffy and swollen appearance, with greater redness in the latter. Atheromatous patches abundant in various parts.

11. F. 36. *Jaundice, impervious ductus communis choledochus; enlarged liver and spleen; fluid in the pericardium.*—The arteries tinged throughout with a deep yellow. On detaching the serous lining, it presented the same hue; small patches of bony and atheromatous deposit in various parts of the thoracic and abdominal aorta; the bile around the patches was deposited in large quantities, giving them a yellow spotted appearance.

12. M. 40. **Disease of the heart; anasarca; nutmeg liver.*—The ascending aorta quite healthy, this part only examined; ossific deposit with vegetations on the aortic valves.

13. M. 17. *Phthisis.*—All the large arteries healthy; at the bifurcation of the aorta, under the serous coat, there were several small transverse white bands, about half an inch in length.

14. F. 2½. *Bronchitis.*—All the large vessels normal.

15. M. 18. *Poisoning by arsenic.*—Small spots of atheromatous deposit under the inner membrane along the orifices of the intercostal arteries; no redness; every other part of the thoracic and abdominal aorta free from disease.

16. M. 46. *Apoplexy with great congestion of the lungs.*—Slight atheromatous deposit in the thoracic and abdominal aorta; the coats of the artery throughout highly reddened by imbibition: the fibrous coat thicker than natural.

17. M. 35. *Death, sudden; rupture of the mitral valve.*—The coats of the thoracic and abdominal aorta extremely thin, but healthy; cauliflower growths on the aortic valves.

18. M. 36. *Phthisis.*—The thoracic and abdominal aorta quite healthy.

19. M. 52. **Dry gangrene of the leg.*—Considerable reddening of the subserous and fibrous coats; atheromatous, cartilaginous, and bony patches in various parts of the aorta.

20. F. 84. **Strangulated femoral hernia*.—The ascending thoracic aorta healthy; in the descending and lower part of the abdominal aorta were several bony patches and abrasions of the inner membrane.

21. M. 40. **Bronchitis*.—Numerous atheromatous, and a few bony patches on the thoracic and abdominal aorta; the iliacs healthy.

22. M. 80. *Death, sudden; crushed between two cart wheels*.—The thoracic and abdominal aorta covered with bony and atheromatous patches; the bone in many places in contact with the blood; the fibrous coat easily separated from the cellular; the branches from the arch as well as from the iliacs much less diseased; the fibrous and inner coats of a deep red throughout.

23. M. 47. **Serous apoplexy; Bright's disease of the kidneys*.—Lining membrane red; elevated atheromatous patches in various parts of the aorta; the iliacs sound; the vessels of the brain, veins, as well as arteries thickened by cartilaginous deposit.

24. F. 24. *Phthisis*.—Slight atheromatous deposit confined to the course of the six upper intercostals; the abdominal, thoracic aorta, and arch healthy.

25. M. 19. *Malignant disease in the parietes of the abdomen*.—Thin atheromatous deposit both in the thoracic and abdominal aorta; in the former very abundant along the course of the intercostals; the iliacs as well as the aortic branches normal.

26. M. 24. *Fever, jaundice (Negro)*.—Arteries bright yellow; the cellular coat beautifully injected (plate III, fig. 1); the arch and ascending aorta contained a few atheromatous patches.

27. M. 30. *Phthisis*.—The inner lining of the thoracic aorta red; coats thin; a few atheromatous patches along the course of the intercostals and arch.

28. F. 48. *Phthisis*.—A thick, bony plate in the upper part of the ascending aorta, another in the abdominal; these arteries in other respects healthy.

29. F. 35. **Nutmeg liver; dropsy*.—A small patch of bony matter in the ascending aorta; the remaining part of the thoracic portion healthy; the abdominal aorta contained a few small patches of atheromatous deposit; the iliacs normal.

30. M. 43. **Aneurism of the ascending aorta*.—Semi-lunar valves healthy; the arch and descending aorta as well as the carotid and subclavian arteries contained a few patches of atheromatous deposit; this much more abundant in the abdominal aorta, forming irregular projections.

31. M. 50. **Aneurism of the ascending aorta*.—No deposit in the ascending aorta below the sac, but small patches were observed around the opening; a few bony plates in the descending and abdominal aorta.

32. F. 64. **Strangulated femoral hernia; Bright's disease of the kidneys*.—The thoracic and abdominal aorta contained a small number of ossific patches; colour natural.

33. F. 26. **Granular disease of the kidneys; puerperal convulsions; ovarian disease*.—The large arteries of the chest, abdomen, and pelvis entirely free from disease.

34. M. 51. **Aneurism of the femoral artery; external iliac tied*.—All the large arteries more than usually healthy, and the femoral, below the aneurism, normal; granular disease of the kidneys.

35. M. 42. **Malignant disease of the liver (abdominal pulsation)*.—The large arteries of the chest and abdomen did not present a vestige of disease.

36. M. 17. **Phthisis*.—Numerous small, white, atheromatous spots in the thoracic and abdominal aorta, especially along the course of the intercostals.

37. M. 26. **Hæmoptysis*.—Small atheromatous spots near the intercostals; in other respects the thoracic and abdominal aorta healthy.

38. F. 16. **Hysterical mania*.—Arteries normal.

39. F. 24. **Pleuritis and bronchitis*.—Small atheromatous spots in the thoracic aorta, near the intercostals; the abdominal aorta healthy.

40. M. 37. **Emphysema and hepatization of lung*.—The arteries normal.

41. F. 50. **Ovarian disease*.—Bony, cartilaginous, and atheromatous patches in almost every part of the thoracic and abdominal aorta, but more abundant in the former; at the aortic arch a dilatation, as large as a shilling, lined with firm bony deposit (plate IV, fig. 9); the internal coats much congested.

42. F. 55. *Dropsy*.—A few white spots on several parts of the thoracic aorta, but more numerous along the origins of the intercostals.

43. M. 11. *Pericarditis*.—All the large arteries normal.

44. M. 53. **Asthma, pneumonia, and bronchitis; kidneys slightly granular*.—A few minute specks of atheromatous deposit in the thoracic and abdominal aorta; the inner coats much reddened, swollen, and easily detached; the redness not removed by washing; the cellular covering also much injected; blood fluid; body warm (plate III, fig. 2.) Examination 16 hours after death. January.

45. M. 44. **Serous apoplexy; mental imbecility*.—The arteries of the brain as well as the large vessels of the chest and abdomen did not present a vestige of disease.

46. F. 16. *Putrid sore throat*.—Atheromatous patches in the descending thoracic, only along the course of the intercostals; small patches in the arch, innominata, and abdominal aorta; the inner membrane of a rosy tint.

47. F. 34. *Asphyxia*.—Patches of atheromatous deposit in various parts of the thoracic and abdominal aorta, but not numerous.

48. M. 31. *Compound fracture of the leg (united); pneumonia; pleuritis; effusion of pus into the larger joints*.—The whole internal lining of the thoracic aorta of a dark red appearance; numerous atheromatous patches along the origins of the intercostals, their long axes corresponding with that of the aorta; abundant small, white, transverse striæ of atheromatous matter on either side of the longitudinal deposit; the abdominal aorta contained a few atheromatous spots at its lower part.

49. M. 60. *Delirium tremens after a fall; (very intemperate)*.—Small atheromatous patches in the thoracic and abdominal aorta, also at the commencement of the right common iliac.

50. M. 8. **Inflammation of the substance of the brain*.—Several small atheromatous patches near the origins of the intercostal arteries, especially the lower; the ascending and abdominal aorta with the iliacs free from disease.

51. F. 21. *Sudden death (cause doubtful)*.—Small white atheromatous patches along the origins of the intercostals. The descending thoracic aorta only examined.

52. M. 49. *Sudden death ; diseased shoulder-joint.*—All the large arteries free from disease and natural in colour.

53. M. 16. *Putrid petechial fever.*—All the large arteries normal ; colour natural.

54. M. 47. **Sudden death ; aneurism of descending thoracic aorta.*—Dilatation of ascending aorta and arch ; patches of yellow atheromatous deposit therein, but not abundant ; abdominal aorta, except at the lower part, nearly free from deposit ; the lining membrane of the descending aorta very red.

55. M. 55. *Phthisis.*—Ascending aorta healthy ; the descending, contained numerous elevated yellow patches,—these were also abundant in the lower part of the abdominal aorta, interspersed with a few small bony plates ; the iliacs normal.

56. M. 21. **Phthisis ; fatty liver.*—Three small white spots near one of the intercostals—the only change observed.

57. M. 50. **Enlarged liver and spleen, the former weighed 10 lbs., the latter 8 lbs. ; diseased condition of the blood.*—All the large arteries of the chest and abdomen free from disease.

58. M. 54. *Tubercular liver ; jaundice.*—The arterial tunics throughout of a light yellow ; a small quantity of atheromatous deposit in the thoracic and abdominal aorta.

59. F. 45. **Acute pericarditis.*—Aortic valves contracted by cartilaginous deposit ; the ascending aorta and arch of a natural colour with a few white patches ; the descending thoracic of an intense red, the redness extending into the fibrous coat (not removed by washing), with numerous cretaceous oblong spots along the origins of the intercostals ; the abdominal aorta contained several cartilaginous deposits ; its colour normal.

60. M. 46. **Grey hepatization of the right lung ; had been salivated several times.*—Ascending aorta healthy ; the descending thoracic and abdominal contained numerous yellow cartilaginous patches. In one part the stages of ossification were beautifully seen, viz. the inflammatory, cartilaginous, and bony.

61. F. 38. **Rupture of the left ovary ; hemorrhage.*—A few very minute specks of atheromatous matter in the thoracic and abdominal aorta.

62. F. 38. **She died after a violent attack of purging and vomiting, which lasted only a few hours.*—The semilunar aortic valves small, and a little thickened. The aortic orifice narrowed (2 inches 4 lines). The ascending aorta above the valves covered with a plate of ossific deposit: smaller plates were seen in various parts; and the inner lining around these was cartilaginous, the consistence varying in different places. The inner membranes were of a red colour, and afforded abundant evidence of chronic inflammation. The aorta, near the origin of the left subclavian, much contracted by bony deposit; the innominate nearly obliterated by a white fibrinous coagulum between the fibrous and inner coats,—the former apparently quite healthy; the space left for the passage of the blood would barely admit a common-sized pin; the descending thoracic and abdominal aorta of a natural colour,—they contained bony and cartilaginous patches. Iliacs healthy; blood fluid; body warm. Examination 12 hours after death. Feb.

63. M. 41. **Cerebral effusion.*—The only morbid changes observed in the large arteries were a few small elevated atheromatous spots in the ascending aorta. Body warm; blood fluid. Exam. 17 hours p. m. Feb.

64. F. 34. *Peritonitis.*—All the coats of the thoracic and abdominal aorta highly injected with blood, the latter to a greater extent. Several small, elevated fatty granules along the origins of the intercostals; they were less numerous in the ascending and abdominal aorta. The granules appeared to be on the inner surface of the serous coat.

65. F. 30. *Phthisis.*—The large arteries of the chest and abdomen free from disease.

66. F. 7. **Miliary tubercles of the lungs.*—The arteries normal.

67. M. 31. *Phthisis.*—All the arteries perfectly healthy.

68. F. 69. **Old age.*—Small atheromatous, cartilaginous, and bony patches in several parts of the aorta, but more abundant in the lower portion of the abdominal. In the inferior part of the right common iliac were four black melanotic spots, which extended through the coats; four small dark-coloured glands were attached to the cellular coat, but not directly opposite to the spots. The black matter, when examined under the microscope presented an amorphous aspect;

pigment-cells absent. No appearance of melanotic matter was seen in any other part.

69. M. 56. *Pneumonia*.—A few atheromatous spots in the ascending thoracic and abdominal aorta. In the ascending aorta was a small aneurismal pouch about the size of a nut, and of a nipple-like appearance; a smooth membrane of a white cartilaginous aspect, lined the interior of the sac—the middle coat appeared to be absent. A pouch similar to the above, but not so prominent, was situated in the lower part of the abdominal aorta. On carefully tracing the fibrous coat, it was found suddenly to disappear around the margins of the pouch, the yellow tissue being replaced by a white fibrinous layer.

70. M. 43. **Phthisis*.—Small cretaceous spots only seen at the origin of the innominate. The lining membrane of the aorta throughout of a dark red, except the anterior part of the ascending aorta; this portion of the artery was of a light pink colour, whilst the posterior part, which was in contact with the blood had a dark riband-like appearance. The iliacs distended with gas; on putting a ligature at each end of the common iliac, it had an elastic feel, and on pricking it under water a quantity of air escaped. The body was examined 43 hours after death, and although the temperature was not more than 50 (March), the body was in an advanced stage of decomposition. Slow death.

71. F. 56. **Scirrhus pylorus*.—Atheromatous and bony matter in small quantities in the thoracic and abdominal aorta, the latter deposit more abundant near the bifurcation; a dark riband-like stain upon the inner lining of the posterior part of the abdominal aorta; the right common iliac contained a long bony plate.

72. F. 32. **Puerperal convulsions*.—Small cretaceous spots along the origins of the intercostals; the inner part of the ascending aorta of a dark red; the other large arteries natural, both in structure and colour.

73. M. 42. **Hæmoptysis; pleuro-pneumonia*.—A few small atheromatous spots in the ascending aorta, also at the bifurcation.

74. F. *Ulceration of the uterus; peritonitis*.—Several small cream-like patches upon the thoracic aorta; they were

more abundant and of a harder consistence near the bifurcation of the abdominal. Although this matter at first sight appeared upon the serous membrane, on a careful examination with the microscope, it was found behind it.

75. F. 79. **Old age.*—The thoracic aorta and its branches, considering the age, more than usually healthy; the abdominal aorta for three inches above its bifurcation converted into a firm bony cylinder; the right internal iliac nearly impervious from ossific deposit, the left less ossified; the common and external iliacs tolerably healthy; in the lower part of the thoracic aorta was a dense fibrinous coagulum, occupying the caliber of the vessel, but not adherent to its sides: it was composed principally of fibrine, with a few blood-globules.

76. M. 38. **Sudden death.*—Body examined with great care, but no disease was found; had been intemperate; the arteries quite healthy.

77. M. about 60. **Apoplexy.*—A few atheromatous and cartilaginous patches in the thoracic and abdominal aortæ.

78. F. 26. *Diffused abscess in the axilla; phlebitis.*—A few minute cretaceous spots in the thoracic aorta; the arteries in other respects healthy.

79. F. 12. **Cyanosis; bronchitis.*—Pulmonary artery absent; other arteries normal.

80. F. 53. **Carcinoma uteri; diseased kidneys; suppression of urine for twelve days.*—Arteries normal.

81. F. 12. *Scrofulous ulceration of several external parts; no tubercles in the lungs; the spleen much enlarged; blood diseased.*—Arteries healthy.

82. F. 40. **Pericarditis (8 oz. of genuine pus in the pericardium).*—A few very minute white specks under the serous lining of the descending thoracic aorta.

83. F. 36. *Pneumonia and pulmonary tubercles.*—Numerous atheromatous spots in the ascending aorta only; the lining membrane of the thoracic and abdominal aorta presented a dark patchy appearance from imbibition. May.

84. M. 53. **Disease of aortic valves; dropsy (Case 6).*—Examination 26 hours p.m.; weather very hot. A few thin bony patches in the ascending and descending thoracic; an abrasion of the serous membrane near the bifurcation of the abdominal aorta about the size of a pea, the edges of a dark

melanotic appearance; no discoloration from imbibition; the pulmonary artery much dilated at its origin.

85. M. 35. *June, weather very hot; examination 28 hours p. m. *Hydrothorax from pleuritis; the chest twice tapped.*—The arteries entirely free from deposit; the lining membrane of the thoracic aorta of a bright red; this redness was confined to the serous membrane, as the fibrous coat was seen of its natural colour when the inner tunics were removed; the colour was not altered by washing; the lining membrane of the abdominal aorta of a natural appearance.

86. M. 53. *June, weather very hot; examination 18 hours p. m. *Melæna; hypertrophy of the left ventricle, and diseased spleen.*—The ascending aorta slightly dilated; the colour of the lining membrane natural; numerous cartilaginous and atheromatous elevations in the thoracic and abdominal aorta, these were interspersed with a great number of concave bony plates; several melanotic spots were also present in the abdominal aorta, one as large as a pea; the matter presented the same appearance as in Cases 68 and 84.

The iliacs were slightly tortuous in their course, apparently from elongation.

87. F. 18. *Syphilis; phagedænic ulceration; fatty liver.*—The arteries healthy, with the exception of one small patch of atheromatous deposit in the abdominal aorta.

88. M. 45. *Hydatid tumour of the liver and spleen.*—All the arteries normal.

89. M. 76. (Sailor.) *Hæmaturia and pulmonary congestion.* A few small atheromatous patches in the ascending aorta, and some in the abdominal, but the arteries, considering the age, were remarkably healthy; the brachial artery contained numerous small semicircular bony deposits under the serous lining; none of this deposit was present in the aorta.

90. M. 78. *Fracture of the clavicle and other injuries from a coach-wheel passing over the chest.*—The thoracic and abdominal aorta contained several atheromatous deposits; a small spot of the lining membrane was abraded in the descending thoracic, and a small patch of bone was seated near the bifurcation of the abdominal.

91. M. 56. *Cancer of the eye.*—A long, narrow discoloration along the posterior part of the descending thoracic; several

cartilaginous elevations in the thoracic and abdominal aorta, but no atheromatous or bony patches.

92. M. 54. *Hydrothorax and granular liver*.—The inner part of the thoracic and abdominal aorta presented a thick rugous appearance, the rugæ taking a longitudinal direction: cartilaginous patches, under the serous membrane, were present in various parts; some of them the eighth of an inch in thickness.

93. F. 69. *Peritonitis after the operation for strangulated femoral hernia*.—The ascending and upper part of the thoracic aorta of a bright vermilion colour, in some places approaching to violet; the colour of the lower part of the thoracic, abdominal, and iliac arteries natural; atheromatous deposit in the lower part of the abdominal aorta, but scanty in the thoracic; the origins of the coronary arteries so much dilated as to resemble small aneurisms,—one would admit a common-sized pea. These arteries were large, but not ossified.

94. M. 40. *Phthisis; both lungs studded with crude tubercles*.—The arteries entirely free from disease.

95. F. 65. *Anasarca; granular kidneys; hypertrophy and dilatation of the left ventricle*.—The cellular coat of the thoracic aorta of a deep red, the colour not removed by washing; a large atheromatous spot in the innominate; the thoracic aorta nearly free from disease; the abdominal below the celiac axis studded with atheromatous deposit.

96. F. 60. **Scirrhus of the pylorus*.—The thoracic aorta natural in appearance, and free from atheromatous deposit, but near the left subclavian it was slightly contracted by two oblong, concave, bony plates, half an inch in length, their long axes corresponding with the circumference of the artery; no ossific deposit was present in any other part of the aorta; the abdominal aorta contained several patches of atheromatous matter; a large, concave, bony plate occupied the commencement of the right common iliac, the left was normal.

97. M. 59. **Excessive hypertrophy of the left ventricle and septum (weight of the heart about 18 oz.); chronic inflammation of the cardiac extremity of the stomach, and interlobular emphysema of the right lung*.—A small quantity of atheromatous deposit in various parts of the aorta, but the arteries, considering the patient's age, were more than usually healthy.

98. F. 14. **Chronic inflammation of the cæcum and tubercular deposit on the peritoneum.*—All the large arteries of the chest and abdomen free from disease.

99. M. 69. **Malignant disease of the bladder, and great hypertrophy of the left ventricle.*—A few white, thin patches in the thoracic aorta, these were more numerous in the abdominal, near the celiac axis; but taking the man's age into account, the vessels were remarkably free from disease.

100. M. 36. **Softening of the brain; hemiplegia.*—The large arteries of the chest and abdomen did not present any abnormal appearance.

101. F. 40. **Malignant disease of the left antrum.*—The arteries generally healthy; the left carotid artery and vein of their natural size and appearance.

102. M. 23. **Pleuro-pneumonia with tubercular deposit.*—A number of small, granular, elevated patches along the origins of the intercostals, and in the posterior part of the abdominal aorta; this deposit, when seen under the microscope, contained numerous fat-globules; fat-globules were also present on the inner coat of the mesenteric veins.

CHAPTER III.

ARTERITIS.

INFLAMMATION of the arteries has only of late years begun to receive that attention from the profession which its importance deserves; and its pathological conditions are yet involved in much obscurity. The disease has been more attended to by continental pathologists, but their conclusions are, for the most part, unsatisfactory. This probably has arisen from the great difficulty of distinguishing inflammatory redness of the serous and sub-serous coats, from simple imbibition. Thus some pathologists suppose that redness of the inner coats is always the effect of inflammatory action; others think that it may exist during life, and may not be perceptible after death. Bertin¹ believes that the colouring matter is fixed in the internal coats of the vessel, and that the vasa vasorum are not necessarily in a congested state. The speculative points, however, on this subject are too numerous for quotation, and their recapitulation could be of no practical utility.

Arteritis, like most other inflammatory diseases, may be divided into the acute and chronic; the former being of less frequent occurrence than the latter. Mr. Guthrie² divides arteritis into the phlegmonous and erysipelatous. "Three cases of the latter form are related, in which death quickly took place from the extension of the inflammation from the wounded vessel to the heart, preceded in each case by low irritable fever, accompanied by deep-seated inflammation of the muscles and internal structure of the thigh."

The lining membrane of the arteries has been found in an inflamed state after operations and injuries of various kinds.

¹ *Traité des Maladies du Cœur et des Gros Vaisseaux*, 1824.

² *On Diseases and Injuries of Arteries*.

Hodgson,¹ Abernethy,² and Cline³ have each mentioned an example: the recorded cases of this description, however, are not numerous.

In the very great majority of morbid inspections which I have witnessed, both in this country and in Paris, the arteries and veins, excepting those near the heart, have been left unexamined; and many of the most valuable morbid specimens we possess have been found accidentally in the dissecting-room.

When this department of pathology is more carefully cultivated than at present, I believe that the diseases of the venous and arterial systems will be found of very frequent occurrence. I need only mention the late investigations of Mr. Paget,⁴ respecting the morbid conditions of the pulmonary artery, in corroboration of this opinion.

Exposure to cold, adynamic fevers, rheumatic metastasis, extension of endocarditis, the sudden disappearance of cutaneous eruptions, the use of deleterious food, and ardent spirits, blows and injuries of various kinds, including surgical operations, the pressure of tumours and the presence of bony spiculæ in the vessel, may be enumerated among the chief of the predisposing and exciting causes both of acute and chronic arteritis.

AORTITIS.

The signs attending inflammation of the aorta are very obscure, and the diagnosis, consequently, extremely difficult. When the commencement of the thoracic aorta is affected, the symptoms usually described are increased and inordinate pulsation of the heart and aorta, great anxiety of countenance, a feeling of suffocation, dyspnoea, orthopnoea, and pains of a burning or tearing character, often accompanied by a sense of impending dissolution.

On reviewing the cases of aortitis reported by various writers, I find a great difference both in the duration and character of

¹ Hodgson on the Diseases of Arteries and Veins.

² Surgical Observations, p. 232.

³ Trans. of a Society for the Improv. of Medico-Chirurg. Knowledge, vol. i, p. 171.

⁴ Medico-Chirurgical Transactions.

the symptoms, and I am driven to the conclusion that the disease is at present involved in so much obscurity, that in the majority of cases there are no indications of its existence. In three examples of supposed aortitis, related by Dr. Bright,¹ the patients were not affected with dyspnœa, and the presence of the disease was only suspected in one instance. In all Dr. Bright's patients there was a general tenderness of the skin. M. Bizot² mentions three cases which he witnessed: "In all there was an œdematous state of the trunk, arms, and face, attended with febrile excitement, but with no irregularity of pulse: the thoracic and abdominal aorta (especially the former) were red, and covered with a soft, thin, yellowish layer of albuminous exudation, easily detached, and giving a rough aspect of the inner membrane." Mr. Smerdon's³ patient laboured under pneumonia of a severe character; extreme orthopnœa was present, the pulse was regular. One hundred and twelve ounces of blood were taken from the arm in five days.

The cases seen by Bertin⁴ were generally combined with endocarditis, and sometimes with inflammation of the lungs and pleura. The latter complication appears to be a very frequent one. Hodgson⁵ met with three examples of this kind, and the Cases 44 and 48 in the table of the morbid appearance of arteries are probably of a similar description. The first was that of a gentleman whom I had known for some years, who was slightly affected with hereditary asthma, and who died under my care of pneumonia and bronchitis. The symptoms resembled those usually present in severe attacks of these diseases; and I was not led to suspect the existence of arteritis. My patient died three weeks from the commencement of his illness. The examination took place (January) sixteen hours after death. The inner and fibrous coats of the thoracic and abdominal aorta were of a dark red, inclining to purple: they presented a soft pulpy appearance, and were easily detached. The redness was not removed after they had been immersed

¹ Hospital Reports.

² Mémoires de la Société Médicale d'Observation, vol. i.

³ Medical and Physical Journal, vol. 46.

⁴ Traité des Maladies du Cœur et des Gros Vaisseaux, 1824.

⁵ Before cited.

in water several days. The body was warm at the time of inspection, and the blood in a fluid state. These circumstances, however, will not explain the phenomenon, as I have seen the arterial tunics perfectly free from stain under similar conditions.

Dr. Corrigan, in the twelfth volume of the 'Dublin Journal,' has published some cases of inflammation of the mouth of the aorta, which gave rise to symptoms resembling those of angina pectoris; and he thinks that aortitis should be enumerated as one of the causes of this affection.

It will be seen from the foregoing observations that the signs of this disease are so various, and its complication with heart affection is so frequent, that we can scarcely hope to arrive, in the majority of cases, at a correct diagnosis. The symptoms are generally urgent when the inflammation is seated near the heart; and it often extends from the lining membrane of this organ to the artery. Here many of the signs before enumerated will be present, and if the caliber of the artery, or the ventricular orifice should be diminished by the deposit of lymph, bellows-sound will probably be heard.

I have seen three patients during the last two years who, I believe, laboured under aortitis. Two of these were affected with rheumatic fever; the third was a policeman who had been exposed to cold: in his, and also in one of the rheumatic cases, orthopnoea, burning pain, and sense of suffocation were present; these two recovered, but both of them are subject to occasional attacks of angina pectoris. The other patient, affected with rheumatic fever, was a young gentleman, who had suffered from this complaint at an early age, and had had five previous attacks. On this occasion the inflammation was confined principally to the knee, and the pain was of a very severe character. The duration of the disease was nine days. In the first stage the arterial excitement was very great; this was subdued, as it had been in previous attacks, by one bleeding from the arm, the application of leeches, and the administration of colchicum and tartarized antimony. Three days before his death he complained of slight uneasiness about the region of the heart, with quick pulse and hot skin. The heart's impulse increased, but the sounds normal. I bled him

from the arm in the erect position, to about sixteen ounces (the blood buffed); no faintness was produced; he expressed himself relieved. I ordered the following:

Chloride of mercury, one grain; Powdered colchicum, one grain; Potassio-tartrate of antimony, $\frac{1}{2}$ of a grain. Every four hours.

In the evening he had subsultus tendinum in the hands and arms, and slight, circumscribed bellows-sound was heard over the upper part of the heart. Up to this time the cardiac sounds were frequently examined, and found normal. I met two physicians of eminence in consultation: one believed that the unfavorable symptoms arose from anæmia, and ordered wine, brandy, opium, and bark to be given at short intervals; but our poor patient sunk on the following day. Unfortunately no post-mortem examination was allowed, and, therefore, the exact cause of death must remain uncertain. I believe, however, inflammation of the endocardium, extending to the semilunar valves and mouth of the aorta, followed by the deposit of lymph, to have been the most probable.

Dr. Elliotson,¹ in speaking of aortitis, says, "I never opened a person who died of this acute affection; but four times I have suspected its existence when acute pericarditis was present. The only ground of my suspicions was the occurrence of a sound like that of a bellows, with the contraction of the heart." Further on he observes, "I have never opened a person whom I have seen labouring under chronic pericarditis, and affording the bellows-sound constantly, in whom a diseased condition of an opening or passage from the heart did not present itself; in whom the opening or passage was not below its natural proportion to the cavity behind it, being itself lessened or compressed, or the cavity behind it increased, so that it was become virtually too small."

These remarks, I think, are, with a few exceptions, applicable to all examples of bellows-sound, when arising from mechanical obstruction to the passage of the blood. If produced, as in some cases of chlorosis and anæmia, by an impoverished condition of the circulating fluid, as well as by a laxity of the arterial tunics, the sound will be less circumscribed, and seldom, I think, confined to one spot, as in the instance alluded to.

¹ Lumleyan Lectures, p. 13.

In the second class of cases, when the inflammatory action is seated in the transverse or descending portion of the thoracic or in the abdominal aorta, I know of no signs which can be relied upon to assist us in our diagnosis. The opinions advanced upon this subject are, for the most part, speculative and delusive, in fact, not based upon pathological investigation.

Morbid Anatomy.—The only morbid changes which can be depended upon as indicative of inflammation of the aorta are, redness, and a pulpy and swollen appearance of the inner and middle tunics. This redness may be extensive, or it may be confined to a small portion of the vessel; sometimes it is uniformly bright and intense, in other instances, and probably at a later stage of the disease, dark, patchy, and approaching to violet, and is not removed by immersion in water or spirit.

I have two preparations in my collection of inflammation of the thoracic aorta from persons who laboured under acute rheumatism. These specimens were in Mr. Langstaff's museum for several years, but the inner lining of the artery still exhibits a red flocculent appearance; in another specimen three pieces of lymph are hanging from the arch of the aorta, but the redness has disappeared.

In addition to the swollen and pulpy aspect which the inner and middle tunics present, the serous membrane loses its transparent and glistening appearance, and is easily detached. Lymph is occasionally found on the surface of the inner coat, but this deposit is less frequent here than in the smaller arteries. The greater caliber of the vessel, as well as the increased impetus of the blood, will perhaps explain the difference.

In some rare instances the abdominal aorta has been obliterated by fibrinous coagula. Three preparations of this kind are in the Guy's Museum. (Nos. 1473, 1474, 1475.)

In the first case, the patient (a watchman) had been ill six weeks; before his death the chief symptoms were hæmoptysis, dyspnœa, orthopnœa, œdema of the lower extremities, with a tendency to gangrene of the right leg. He appeared to die of apoplexy, although no extravasation of blood was found in the skull. The aorta was obliterated above the diaphragm by a cauliflower-shaped mass of bony vegetation, which would not

admit a probe, but it was percolated by the blood. Another obliteration was situated near the cœliac axis, but of less extent than the former; the aorta was dilated, and its coats much affected with bony and atheromatous deposit, the heart large, valves healthy, the intercostals of their usual size.

In the second specimen, the aorta is obliterated above its bifurcation by non-adherent fibrinous coagulum, which extends into the iliacs.

In Mr. Crampton's case¹ (1475) the obliteration is seated near the bifurcation of the aorta, and had probably existed for a long time, as the lower intercostals, spermatic, internal, mammary, lumbar, and middle sacral arteries were much enlarged, and the iliacs impervious. Nothing is known of the history of the patient. Mr. Crampton believes this to have been originally an aneurism which was spontaneously cured, and I think those who carefully examine the preparation must come to the same conclusion. The artery before its bifurcation is dilated and filled with dense coagulum. The iliacs appear to have been obliterated by inflammation.

In addition to these, examples of total obliteration have been recorded by Louis, Bougou, Desault, and Duncan. In Case 75 (Table of Arteries), the lower part of the thoracic aorta was plugged by a dense fibrinous coagulum; this formation probably took place some time before death. The patient, from mental imbecility, was unable to describe her symptoms, but she screamed frequently, and appeared to suffer much pain; the breathing was not much quickened.

The friends of the patient, who had watched her very attentively, requested me to make an examination of the body, as they felt assured that I should find something unusual. The viscera of the chest and abdomen presented a natural appearance, and the diseased condition of the arteries already described was the only morbid change observed.

Although these coagulations are probably in some instances the effect of inflammation, they may I think occur from deficiency in the heart's action, combined with a roughened and diseased state of the coats of the aorta. Some of these obstructions may take place, as in the case last spoken of, a short

¹ Dublin Hospital Reports, vol. ii.

time before death, when the *vis a tergo* is not sufficient to propel the blood through the diseased tube. John Hunter says that the blood will not coagulate in a healthy artery, an opinion which I believe to be correct.

Treatment.—When the symptoms lead us to suspect the presence of aortitis near the cardiac opening, and it is only, I believe, in this situation that our diagnosis is likely to be correct, the most prompt and active measures must be had recourse to. Bleeding from the arm to a large amount, if the state of the patient will bear it, leeches over the cardiac region, followed by blisters and mustard poultices to the feet as derivatives, with calomel, opium, and tartarized antimony at short intervals, will be the most likely means of arresting the inflammatory action. Where the diagnosis is confessedly so difficult, the treatment that I have recommended may be thought by some to be too energetic; but it must be borne in mind that the disease in question is one rapid in its progress, and dangerous both in its immediate and ultimate effects, and unless treated actively at the onset, it will be but little under our control. If the patient is not seen, or the disease not suspected, until lymph is deposited upon the valves or lining membrane of the aorta, and a mechanical obstacle is thereby offered to the passage of the blood, our treatment, I fear, can be only palliative;—setons or blisters over the region of the heart, the latter kept open with savine ointment, mild doses of mercury continued for a long period, with the enforcement, if possible, of mental and bodily quietude, will probably be found the most efficient means of producing ultimate benefit.

Before quitting the subject of acute aortitis, I may allude to a contracted state of the aorta which appears to take place at the time of closure of the ductus arteriosus. I had come to this conclusion before reading Dr. Craigie's paper in the fifty-sixth volume of the 'Edinburgh Medical and Surgical Journal,' having previously perused most of the cases related by him. I had also examined the three preparations in the Guy's Museum. To Dr. Craigie, however, is due the merit of having first directed the attention of the profession to this subject.

In looking over the annexed table of seventeen cases, it is

curious to observe the little inconvenience which most of the individuals suffered from this abnormal condition of the aorta: one man lived to the age of ninety-three. In three cases the aorta was entirely obliterated; two patients (5 and 9) died of rupture of the ascending aorta, another from rupture of the left ventricle, and a fourth from rupture of the right auricle. No signs exist by which these obliterations and contractions can be recognized during life.

TABLE

OF CONTRACTIONS AND OBLITERATIONS OF THE THORACIC AORTA.

No.	Authorities.	Age.	Sex.	Symptoms, &c.	Morbid Appearances.
1	Guy's Hospital Reports, vol. 7. (Mr. Muriel.)	25	M.	For nine years before his death the symptoms resembled aneurism. Died in a comatose state.	Constriction almost amounting to obliteration near the ductus arteriosus. A tumour the size of a hen's egg opposite the constriction.
2	Guy's Museum (Dr. Back.)	33	M.	Large frame, ill three months; bruit de scie, irregularity of heart's action; legs slightly œdematous.	Heart large; valves imperfect; aorta contracted near the ductus arteriosus; at this point the inner membrane presents a puckered appearance.
3	Guy's Museum (Mr. Key.)	38	M.	Icterus from stone in the neck of the gall-bladder.	Sudden annular contraction near the termination of the ductus arteriosus. The contracted aperture would not admit the little finger.
4	Archives Générales de Médecine, 1841. (Roemer, Vienna.)	50	M.	Dyspnœa, gastralgia. Sudden death.	Aorta obliterated below the ductus arteriosus. The arch as far as the innominata much dilated: at that point the aorta was contracted near the duct to half an inch. The abdominal and pectoral portions were not larger than those of a child of 10 years.
5	Edinburgh Medical and Surgical Journal, vol. 56. (Dr. Craigie.)	7	F.	Hot skin, pulse 140; great impulse of carotids. Death in eight days.	Aorta contracted to the extent of from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch below the ductus arteriosus. Previous endocarditis; patch of solid bone on the aorta. Heart large. Ductus arteriosus impervious.
6	Journal de Chirurgie, 1791. (M. Paris.)	50	F.	Found in the dissecting-room.	Aorta contracted just below the ductus arteriosus. A small aperture left.
7	Med. Chirurg. Trans. vol. 5. (Dr. Grayham.)	14	M.	Pain in the left side; dyspnœa; palpitation; beating of the carotid and temporal arteries. Treated for pneumonia.	Aorta completely contracted, as if a ligature had been applied immediately below the ductus arteriosus. That duct probably impervious.

CONTRACTIONS AND OBLITERATIONS
OF THE THORACIC AORTA.

No.	Authorities.	Age.	Sex.	Symptoms, &c.	Morbid Appearances.
8	North of Eng- land Med. & Surg. Journ. (Mr. Jordan.)	21	M.	Strong and powerful. Sud- den death.	Aorta entirely obliterated below the ductus arteriosus. Rupture of the descending part.
9	Otto's Com- pendium trans- lated by South. (Dr. Otto.)	17	F.	After going with bare feet, pain over the sternum, small pulse. Sudden death Before this healthy.	Aorta contracted near the ductus arteriosus, so as not to admit a goose-quill. Rupture of the aorta near its origin. Coats sound.
10	Cooper's and Travers's Surg. Essays, p. 115. (Mr. Winstone)	57	M.	Dyspnœa; pain under the sternum; pulse weak and regular. Sudden death.	Stricture of the aorta near the ductus arteriosus. Rupture of the right ventricle.
11	Tract publish- ed in Paris, 1832. (M. le Grand.)	48½	M.	Inflammatory symptoms; bellows-sound; throbbing of temporal arteries.	Aorta contracted below the ductus arteriosus; not entirely oblite- rated.
12	Journal Heb- domadaire, vol 1. (M. Reynaud.)	9½	M.	Imperfect history. Died ap- parently from old age. Pulse strong.	Aorta contracted to the size of a crow-quill close to the ductus arteriosus.
13	Archives J. F. Meckel, 1827. (Meckel.)	35	M.	Strong countryman. When carrying a heavy weight felt sudden weakness and pain in the stomach. Appeared better till the sixth day, when he fell lifeless.	Aorta contracted below the ductus arteriosus to the size of a straw. Rupture of the right auricle.
14	Dublin Hospi- tal Reports, vol. 9. (Mr. Nixon.)	27	M.	Medical man. Throbbing of the subclavians and carotids. Dropsy. Dys- pnœa. (Much suffering.)	Aorta obstructed to half its calibre near the ductus arteriosus. This duct pervious. Small abscess in the muscular structure of the heart.
15	Forbes's Bri- tish and Fo- reign Med. Rev. 1845. (Dr. S. Hamernjk.)		M.	Some years before his death was squeezed by a wag- gon. A number of pulsating tumours along the back, from the enlarged con- dition of the arteriæ transversalis colli, sca- pulæ, and subscapulæ. Soldier, intemperate, dys- pnœa, dropsy, pulse 100 to 110, feeble, but not intermittent.	Aorta completely obliterated after giving off the left subclavian. The internal mammary arteries much enlarged, and left subcla- vian 6½ lines in diameter at its origin.
16	Tiedemann on the Aretation and Closure of Arteries.	60	M.		Aorta contracted below the left subclavian. The epigastric and internal mammary arteries, tor- tuous, much enlarged, and their walls ossified.
17	Museum Royal College of Sur- geons, Dublin. 183.	40	M.	Soldier, strong and mus- cular; not suspected dur- ing life. The specimen discovered accidentally.	At the termination of the arch of the aorta the vessel is reduced to the size of a goose-quill, and the contraction continues for half an inch.

Inflammation of the arteries of the extremities.—In inflammation of the arteries of the extremities, there is less difficulty in the diagnosis. Pains of a burning, pricking, and shooting character are present, with great tenderness on pressure along the course of the vessels. These symptoms are often followed by absence of pulsation in the affected artery, with a disposition to dry gangrene of the limb, especially when occurring in the lower extremities. In some cases I have felt the vessel hard and cord-like. The skin in the acute form is hot and dry, with the usual symptoms attending upon febrile action. Some authors have described inordinate pulsation as one of the characteristics of arteritis. I have never met with this phenomenon.

In old people, the inflammation is for the most part of a subacute character, and the symptoms are less severe; the pain nevertheless in the first stage is generally violent, and the tendency to gangrene more frequent.

Pathological effects.—One of the most common effects of inflammation of the arteries of the extremities, is coagulation of the blood, fibrinous deposits adherent to the sides of the vessel, producing obstruction, and often entire obliteration of the tube. In some instances the main artery only is affected, in others the collateral and terminating branches. If the obstruction is situated far from the heart, dry gangrene generally takes place. In the upper extremities, however, this termination is of rare occurrence, unless the inflammation should extend upwards from injury to the hands or fingers, as in Cases 9 and 10.

The accompanying preparations, Nos. 5, 6, 7, and 8 (College Museum) are good examples of the effects of acute and chronic arteritis upon the larger arteries of the lower limbs. Some high authorities believe that arteritis is not present in the dry gangrene of old people. I have paid much attention to this complaint for many years, and have had an opportunity of inspecting the bodies of several who have died of it. I have invariably found the lining membrane of the artery of a red appearance, the vessel often obstructed by fibrinous coagulum, some distance above the gangrenous part, as well as in the arteries near the seat of the disease. The inflammatory red-

ness is not present in the preparations alluded to, and therefore they give but an imperfect idea of their condition when taken from the body; there is, however, I think (if our present opinions respecting the effects of inflammation are correct), abundant evidence to show that it had existed. Dr. Carswell, in the 'Cyclopædia of Practical Medicine,' speaking of dry gangrene, says, "It is stated by some pathologists that this form of mortification sometimes occurs in young persons, and is much more frequently met with in males than females. The former statement we believe to be an error originating in an imperfect knowledge of this disease; for *as we have ourselves never seen it in young persons*, and as this statement has not been supported by other than mere negative facts, and these, too, very incomplete, we must continue to regard it as a disease peculiar to persons advanced in life, and occasioned by morbid states of the arterial system, which occur only in such persons, at least to such an extent as to produce local death."

The cases hereafter mentioned, as well as many others on record, fully prove the incorrectness of this opinion.

Many who like Dr. Carswell believe that dry gangrene is the result of debility and not of inflammation, appear to have forgotten that inflammatory diseases are very common in old people. According to the researches of Messrs. Hourman and Dechambre, at the Salpêtrière,¹ inflammation is the most frequent cause of death in old persons.

How often the aged are affected with cutaneous inflammation of the legs; and reasoning from analogy, why, let me ask, may not the internal coats of the arteries be subject to the same engorgements? We have, I think, abundant evidence to show that ossification alone is not sufficient to produce the disease, as this deposit exists to a great extent in the majority of individuals who have attained an advanced age. The most common of the existing causes of acute arteritis in the aged is, I believe, the detachment of a portion of the bony plate of the artery. The great toe, a part the most exposed to mechanical injury, is often the first affected. This accident, I conceive, may occur at any part of the vessel, and its effect will probably be the production of inflammation, plugging of

¹ Archives Gén. 1835.

the collateral branches, and the consequent death of the parts below the seat of obstruction.

Treatment.—In the acute form of the affection, especially when it occurs in young subjects, and the patient is seen in the early stage, our object should be to subdue inflammation, and thereby prevent the tendency to coagulation of the blood, and the formation of the plastic material. Bleeding from the arm, leeches applied along the course of the affected artery, with the administration of the same medicines as are recommended in acute aortitis so as slightly to affect the gums, must be had recourse to.

In some cases these active measures cannot be resorted to, in consequence of the age and constitutional peculiarities of the patient. I would, however, in all instances, in the first stage of the disease, advise as strict an adherence to the anti-phlogistic plan of treatment as circumstances will allow; the previous habits of the patient being also taken into account: thus, in an habitual drunkard, the entire abstinence from an accustomed stimulus should not be enjoined, although the quantity of this stimulus may be considerably diminished.

In old subjects, the structure of whose arteries is much altered by the various deposits, and in whom the supervention of acute arteritis is not uncommon, I have found the most benefit to arise from large doses of opium, combined with a mild and unstimulating diet. The local treatment should consist in attention to the position of the limb, hot fomentations, and sometimes the use of linseed-meal, yeast, and beer-grounds poultices. In some cases the limb is more comfortable when no external applications are used. Pott¹ says that he gave bark a fair trial, and came to the conclusion that it was entirely useless. He thought highly of opium, and preferred soothing applications to stimulant, (his cases are all deficient as regards pathological appearances.) Dupuytren,² to whom I believe we are indebted for pointing out the true pathology of this disease, says that, "after abandoning the stimulating treatment and pursuing the antiphlogistic, I was enabled to relieve and cure three fourths of my patients." He frequently took blood

¹ Chirurgical Works, p. 796.

² Leçons Orales.

from the arm, even in the aged, and with apparent benefit. I have had no experience of this depletory mode of treatment in old persons, and therefore cannot recommend it. Mr. Syme, in the first number of the 'Edinburgh Monthly Journal of Medical Science,' January 1841 (after my paper upon this disease was written), mentions the case "of an old woman who laboured under dry gangrene of the foot: for the first week she was treated in the usual manner; all stimulants were then withdrawn, and a strictly farinaceous diet enjoined, with water for drink, and a simple poultice to the foot. The sores healed kindly, and presented on each side of the foot a no less seemly cicatrix, than if a skilful amputation had been performed. The starving plan was then abandoned, and the poor woman, after subsisting on bread and water for upwards of four months, was allowed the usual diet of the hospital." He condemns the stimulating plan of treatment, and adds, "that no inconvenience has ever been sustained, to his knowledge, either from adopting the spare system, or resuming the ordinary one, even when the age of the patient was beyond eighty years."

In reference to a late remarkable trial, *Baker v. Lowe*,¹ Mr. Liston has recently expressed himself to the following effect: "In constitutional gangrene, the exhibition of stimulants with opium is the method which has generally been pursued by surgical practitioners. I have, however, seen fit to follow the opposite plan in very many cases, and have advocated this mode in my surgical lectures for several years past. My theory and practice therefore, in the case in question, were quite in unison. I doubt much if the stimulating plan, in constitutional spontaneous gangrene, as it has been called, has not hitherto been uniformly taught by even some of the witnesses for the defendant; and I am, moreover, fully convinced that in nineteen cases out of twenty, practitioners would have pursued the treatment adopted by Mr. Baker, recommended as it is in many of the best surgical works."

As regards the propriety of amputating in this disease, I think in the young the operation is, for the most part, justifiable, when the collateral branches are sufficiently enlarged to carry on the circulation, and when a line of demarcation is

¹ Edinburgh Monthly Journal, March 1845.

formed between the dead and living parts. The four cases hereafter mentioned serve to strengthen this opinion. Several who saw my patient (Case 1) advised me not to operate, believing that there would not be a sufficient supply of blood to heal the wound. Amputation, in old subjects, has seldom been attended with a favorable result. "Mr. Langstaff¹ (at the earnest solicitation of the patient) removed the leg of a man seventy years of age, affected with dry gangrene; the stump healed in ten days, but death occurred from angina pectoris seven weeks after the operation. The blood-vessels belonging to the thigh presented the following morbid appearances, from the surface of the stump as far as the iliac. The main arteries of the thigh, and to where the external iliac is given off, were obliterated by lymph and coagulated blood. What is still more singular in this case is, the veins belonging to the thigh, and as high as the external iliac, where it assists in forming the vena cava inferior, were shrivelled and obliterated."

The following cases have occurred in my own practice or in that of my friends. Several of them were recorded in my essay on Dry Gangrene, published in the 'Lancet' (May 1841), and the others have been witnessed since this period. They are inserted chiefly for the purpose of elucidating the pathology of arteritis; but in other respects I think some of them possess features of great interest.

CASE I.

January 31st, 1835. I was requested to visit Mary C., aged 22, of healthy parents, residing at Camberwell. She had cholera in March 1831, and says "that her mouth was slightly affected by mercury, but that she speedily recovered." I attended her two years since, during a severe attack of pneumonia, after which she had occasional cough for some time. She had been at service for ten or twelve years, and during that period was generally able to pursue her usual occupations; although she was occasionally prevented from doing so, by headache and hysteria. For the last three or four days she has

¹ Museum Catalogue.

complained of pain in the legs and arms, with rigors, followed by heat of skin. This morning there is pain in the epigastric region, rather increased by pressure. Pulse small, 90; tongue white, tip red; bowels confined. The menses have appeared regularly, but the discharge has been small in quantity.

Sulphate of magnesia, one ounce; Solution of potassio-tartrate of antimony, half an ounce; Water, five ounces and a half. Mix. A fourth part to be taken every four hours. Blue pill, Extract of colocynth (compound), each five grains. Make two pills, to be taken at bedtime.

February 1st. Less pain in the region of the stomach, but the thighs and legs are very painful; more so when pressure is used; no redness or swelling; pulse small and frequent; no sleep; bowels well relieved; motions offensive.

Wine of colchicum, Solution of potassio-tartrate of antimony, of each two drachms; Camphor mixture, Water, of each three ounces. Mix. A fourth part to be taken every four hours. Compound ipecacuan powder, ten grains, to be taken at bedtime.

2d. Much the same as yesterday; slept two or three hours; still complains of great pain in the legs and thighs; none in the epigastric region; tongue red at the tip, with white base; pulse small, 90; ordered the lower extremities to be fomented with a hot decoction of poppy-heads.

Chloride of mercury, Antimonial powder, Powdered colchicum, each six grains. Mix, and divide into six powders, one to be taken every four hours.

3d. Called this morning at one o'clock, and found her suffering from violent pain in the region of the stomach, increased on pressure; frequent vomiting (the first since her illness); no pain in the lower extremities; pulse very small; has fainted two or three times; opened a vein in the arm, and with much difficulty obtained about ʒviii of blood, after which she expressed herself to be somewhat relieved.

A blister to the epigastric region, and sinapisms to the feet. A draught of sesquicarbonate of soda and tartaric acid every four hours in effervescence.

Eight p.m. Pain less; pulse more expanded; blood cupped, and buffed.

4th. Has very little pain in the region of the stomach, but the legs and thighs are again excessively uneasy; no heat or redness, and the pain appears to be confined to the integuments; bowels relieved.

Continue the medicines. Extract of poppy, Powdered rhubarb, each five grains. Make two pills, to be taken at bedtime.

5th. Fainted once in the night; no sleep; hands and arms cold, with a tingling sensation in the fingers, succeeded by acute pain in the integuments of the arms, which is absent in

the legs and thighs, and very slight (on pressure) in the epigastric region: tongue furred, tip and edges red; bowels open; *no pulsation at either of the wrists*; the heart and carotids pulsating with great violence.

Repeat the effervescent medicines. One grain of opium at bedtime.

8th. Has remained much in the same state since the last report; very little sleep; excruciating pain in the arms and legs; but seldom occurring in both at the same time; slight tenderness in the epigastrium; no vomiting; sounds of the heart rather louder than natural; respiratory murmur distinct in both lungs. The menses appeared on the 4th of February, and ceased to day. She says, that "she observed no change in the symptoms during their continuance." *Pulsation absent at both wrists since the 5th.* Has continued the effervescing draught, with a grain of opium, and ipecacuanha, morning and evening.

Sesquicarbonate of ammonia, half a drachm; Tincture of opium, twenty drops; Camphor mixture, six ounces. Mix. A fourth part every four hours. Compound ipecacuan powder, ten grains at bedtime.

9th. Took the medicine only once, as it produced vomiting; pulsation ceases about an inch below each clavicle; the dorsal arteries of the feet pulsating forcibly, 90; the heart and carotids beating with less violence than yesterday.

An effervescing draught every four hours. Sedative solution of opium, twenty-five drops at bedtime.

10th. Symptoms the same as yesterday; no sleep for the last five or six days.

Continue the effervescing draughts, and the opiate at bedtime.

11th. Passed a restless night; did not retain the opium draught upon the stomach; the integuments of the right arm extremely painful; met Dr. Whiting in consultation, who examined the arteries with great care, and found the pain much increased when pressure was made over the arteries of the upper extremities, particularly the right. Dr. Whiting recommended eight leeches to be applied below the right clavicle, and a warm spirit lotion to the arm, with the following:

Chloride of mercury, one grain; Potassio-tartrate of antimony, $\frac{1}{8}$ of a grain, every four hours. Wine of colchicum, ten drops; Sulphate of magnesia, one drachm; Water, ten drachms; to be taken three times a day.

12th. No sleep; pain in the right arm diminished; has been very faint since the leeches were applied; bowels relieved twelve or fourteen times; motions fluid, yellow, and offensive; on pressing the spinous processes of the upper dorsal vertebræ

she complains of pain, but not more than when the skin of the back is touched; says "her feet are cold and numb, and has asked the attendants if her toes are not contracted?" on examining the feet I found them quite warm.

Repeat medicines, and add two grains of Dover's powder to each pill. Sedative solution of opium, twenty-five drops at bedtime.

13th. Slept four hours after the draught; can move the arms without difficulty, but has slight pain in the course of the arteries when pressure is made; the left foot and leg are extremely painful; feels no uneasiness when the anterior part of the leg is pinched, but complains when the back part is pressed; *no pulsation in the dorsal artery of the foot*, and rather indistinct in the popliteal; heat of the limb below the natural temperature; carotids pulsating feebly, and on placing the finger upon them, a thrilling sensation is communicated; "bruit de soufflet" observed for the first time over the region of the heart.

Continue the medicine, and take thirty drops of Battley's sedative solution at bedtime.

14th. I believe that I can distinguish a slight vibratory motion at intervals in the left radial artery; she has had five or six hours' sleep; the right arm is again very painful; the gums slightly affected by the mercury; she has expressed a great desire for porter; hitherto her diet has been farinaceous, with beef-tea and broth occasionally.

Sesquicarbonate of ammonia, one scruple; Sesquicarbonate of soda, one drachm; Tincture of orange-peel, two drachms; Water, six ounces. Mix. One fourth part to be taken every four hours with lemon juice.—Repeat the opiate draught at bedtime.

15th. Symptoms nearly the same as yesterday; no bellows-sound over the heart; has taken three quarters of a pint of porter; ordered one pint daily.

Continue the medicines.

16th. Pain in the left foot and leg so severe that she is frequently screaming; no pulsation in the arteries of the upper extremities, nor in the left popliteal; tongue red and moist; skin covered with perspiration; the porter to be continued.

Sulphate of quinine, two grains every four hours. Repeat the opiate at bedtime.
A Belladonna plaster to the leg.

17th. Foot and leg more painful since the plaster was applied; no pulsation in the left popliteal, but very distinct in the femoral; pain much increased when pressure is made in

the course of the arteries ; slight pulsation in the left brachial and radial arteries (beat synchronous with the heart). Dr. Whiting saw her again this afternoon, and recommended twelve leeches to be applied to the left groin ; the foot to be fomented with hot spirits and water, and a large blister to be applied to the lower part of the abdomen. Dr. Whiting thought that, by pursuing this plan of counter-irritation, we might prevent the disease from extending to the larger arteries. The belladonna plaster to be removed.

Sesquicarbonate of ammonia, three grains ; Di-sulphate of quinine, one grain ; Simple syrup, half a drachm ; Water, ten drachms. Mix. To be taken three times a day.—Sedative solution of opium, twenty-five drops at bedtime.

18th. Pulsation absent in both upper extremities, and ceases about three inches below Poupart's ligament in the left thigh ; slept for a few minutes at intervals during the night ; pain excessive ; the foot and fore part of the leg of a purplish colour ; the cutaneous veins distended with dark blood ; tips of the toes cold, and the foot rather below the natural standard ; perspiration profuse over the upper part of the body ; has been very faint since the leeches were applied ; continues the porter ; hot fomentations to the foot.

Repeat the quinine draught and the opiate.

19th. Foot purple and cold ; pain increased ; perspiration abundant during the night.

Continue the medicines.

20th. The foot is not swollen ; temperature 84 F. ; perspiration profuse ; no sleep.

Continue the medicines.

21st. Pain more severe ; slept three or four hours ; temperature of the left foot, 80 F. ; right foot and arm, 92.

Continue the medicines.

22d. During the last two or three days she has complained of pain in the right popliteal space ; yesterday she felt pain and tenderness in the calf of the leg, and at about eight p. m. a numbness in the foot, succeeded by intense pain, which has continued. On pressing along the course of the femoral artery it is much aggravated ; no pain when pressure is made on the outer and back part of the thigh ; suffers much when the left femoral artery is pressed, but not so severely as on the 17th. *No pulsation in any of the arteries of the extremities ;* the toes and sole of the left foot black ; temperature 84 ; right

foot 90; ordered a blister to the outer part of the right thigh, and eight leeches to the foot.

One grain of opium three times a day. Repeat the opiate draught at bedtime.

23d. Slept five or six hours; excruciating pain in both feet; fore part of the left, black; the instep and ankle red; temperature of the former 80, latter 91; pulsation feeble in the left radial and brachial arteries.

Repeat the medicines.

24th. Slept four or five hours; pain not so violent as yesterday; left foot much in the same state; temperature of the toes 60, ankle 68, right foot 81.

Repeat the medicines.

25th. Pain less; several phlyctenæ on the left ankle; pulsation absent in all the extremities.

Continue the medicines.

26th. Symptoms the same as yesterday.

Continue the medicines.

27th. Feet very painful, especially the left, which looks rather better than on the 23d; temperature of the sole 70, instep 83.

A quinine draught every six hours. Sedative solution of opium, forty minims at bedtime.

March 6th. Since the last report the pain has been excessive; very little sleep; night perspirations; has complained of pain in the region of the heart; "bruit de soufflet" very distinctly heard; suffered yesterday (for the first time since her illness) with pain in the right side of the head, which subsided in a few hours; bowels have acted regularly; motions healthy; the fore part of the left foot in a state of sphacelus, with a red line of demarcation extending obliquely across; has continued the opium and quinine daily; ordered yeast poultices to the foot.

Continue the medicines.

8th. The little and great toes of the right foot black and painful.

Continue the medicines.

16th. Removed the phalanges of the two outer toes of the left foot, since which operation she has had less pain; slight pulsation in the left arm for the last four days; has taken port wine and porter daily with the opium and quinine.

Continue the medicines.

22d. Pulsation absent in all the extremities since the 17th;

"bruit de soufflet" over the region of the heart; tongue scarlet and moist; secretions and excretions healthy; no extension of the gangrene on either of the feet.

Continue the medicines.

28th. Pulsation absent in the arteries of the limbs, but was perceptible in the left arm from the 23d to the 27th.

Continue the medicines.

April 7th. Pulsation ceases at about two inches below Poupart's ligament on both sides, and can only be felt at about half an inch below each clavicle; granulations abundant; since the 26th has been able to take a mutton chop daily, with port wine and porter.

Continue the medicines.

October 1st. Her health has gradually improved; the appetite is good; tongue clean; secretions and excretions healthy; the menses appeared in June, and have returned regularly. During the last two months she has complained of giddiness and occasional pain in the head, with dimness of sight coming on towards the evening; but she says that "her health is nearly as good as it was previous to this attack." The pain in the foot has been so intense that for a considerable time she took six grains of opium daily; notwithstanding this, the bowels acted regularly. She continued the quinine with the compound iron mixture until the 20th of June, since which time she has taken no medicine. The bellows-sound is sometimes heard over the region of the heart; pulsation generally feeble in the left brachial and radial arteries for the last three months, and absent in the right arm since February, this arm she says, "is not so strong as the other, but she is able to use her needle nearly all the day." In the left femoral artery pulsation ceases at about two inches below Poupart's ligament; in the right it can be felt as low as the triceps. She has lost the first phalanx of the great and little toes of the right foot; all the phalanges and three of the metacarpal bones of the left, and the two remaining are partly exposed. A portion of the os calcis has exfoliated on each side; the foot is much inverted and the integuments puffy, and painful on pressure; is not able to keep it down for more than two or three minutes at a time, the pain becoming excessive, and the skin assuming a leaden hue; the right foot and leg are generally cold; she is very anxious to have the leg removed.

5th. With the concurrence, and in the presence of my friends Messrs. Bristowe, Bryant Hughes, and Beane, I performed the circular operation below the knee. On slackening the tourniquet, I found that there was very little bleeding from the large arteries, *the blood not coming per saltum*. The smaller vessels, however, bled profusely, and it was necessary to tie nine or ten of them; but little blood was lost, and she bore the operation remarkably well; gave her thirty-five drops of laudanum. Examined the leg with great care; slit up all the larger arteries; could find no trace of disease in them, *but they appeared to be smaller than natural*; the veins and nerves healthy. Nine p. m. Complains of great pain in the stump; pulse (left radial) quick, with hot skin, thirst, &c.

An effervescing mixture every four hours.

6th. Slept two hours; pain less; a little oozing of blood from the wound.

Continue the medicines.

7th. Symptoms the same as yesterday.

Continue the medicines.

30th. Has gone on well, with the exception of a little sloughing on the tibial side of the wound; the part, however, soon put on a healthy appearance, and is now nearly healed; the catamenia appeared on the 9th.

Dec. 21st. A portion of the stump (about the size of a half-crown) not healed; the granulations pale, with sero-purulent discharge; her health has improved since the last report, and she is able to get from one room to another with the assistance of crutches; the right foot is generally cold, with the pulsation the same as before the operation. Two gentlemen saw her on the 19th, and "thought that they could distinguish feeble pulsation in the right brachial artery." I have not been able to detect it. The bellows-sound is often heard over the heart and large arteries.

February 1838. At the last report the stump had not healed, it remained in an indolent state for ten months, when it became perfectly cicatrized, and she was soon able to use a wooden leg. I have frequently seen the patient since that time; and this morning, assisted by a medical friend (Mr. Webber), I made a very careful examination of the principal arteries of the body, and also ascertained the following particulars, viz. :

That her health has been quite as good as before the attack, and that she has not been so subject to hysteria, but has had more headache, and that her sight is somewhat impaired, especially towards night. She has menstruated regularly; has had no palpitation of the heart; good appetite; bowels regular; has sometimes walked a distance of two miles; the stump is always cold, and she was obliged to envelope it in cotton during the winter; the skin frequently has a purple tinge; the right foot and leg also cold; the latter as well as the stump often affected with chilblains, and the foot becomes œdematous sometimes towards evening; the arms and hands are below the natural temperature; the right arm frequently numb, and she has less muscular power in it than in the left; the sense of touch perfect; if slightly bruised the skin on the arms becomes black; perspires on the trunk and face profusely in warm weather; says "the perspiration is less on the right arm than the left;" no pulsation can be felt below the clavicle on the right side, and on the left it is extremely feeble, and sometimes imperceptible, both in the brachial and radial arteries; in the right femoral artery pulsation ceases about two inches below Poupart's ligament, and in the left at about an inch and a half; the beat of the carotids is much reduced in force, 80.

The sounds of the heart are natural; "bruit de rape" is heard in all the plugged arteries.

A few months after this report (May) I visited her with Messrs. Liston and Pilcher, and we then found the arteries in the state last mentioned.

January 15th, 1841. I again carefully examined the arteries, and found them as before described in 1838; slight bellows-sound is heard above the right clavicle; she states "that her health has been better of late, and that during the present cold weather she has less difficulty in keeping up the temperature of the limb than formerly, when she was often obliged to place the foot on a tin vessel containing hot water."

October 30th, 1845. I saw her with my friend Mr. Webber, who examined her with me in February 1838. The following is her present condition. Her general health is better than it was fifteen years since, and she is robust in appearance; the foot and hands are still very cold in winter, especially the right

hand, which is affected with pain and tingling when immersed in cold water; pulsation in the left brachial and radial arteries feeble, 84; on placing the finger on the right radial there sometimes appears to be a slight vibratory motion, as if only a small quantity of blood passed through the artery, but no pulsation can be felt in the brachial, axillary, the right popliteal, or tarsal arteries.

Stethoscopic signs.—A slight shock is heard over the subclavian, but the rough bellows-sound, which formerly existed, is not present; the heart's impulse is rather greater than natural, and the first sound loud, but not abnormal.

October 1846. In the same state as when seen last year.

The limits of this treatise will not allow me to remark on the various points of interest connected with the above case, which I believe is the most extraordinary of the kind on record; but little doubt, I think, can be entertained respecting the cause of the absence of pulsation in the limbs. Arteritis of an acute character existed in the axillary and femoral arteries of both extremities, producing deposit of lymph, with total or partial plugging of the vessels.

CASE II.

Mr. B., aged $21\frac{1}{2}$, grocer's assistant, came to me this morning, August 9th, 1843, at ten o'clock, complaining of pain in the inner and upper part of the arm. When putting on his waistcoat, at seven o'clock, he felt a pain like the prick of a pin, about the middle of the upper arm, which lasted for an hour, during which time the limb became cold as far as the elbow. I had seen him two days previous to this, when he complained of slight pain in the chest; and I gave him some aperient medicine, with potassio-tartrate of antimony. The pulse at the *left* wrist was *then felt, and nothing remarkable* observed; there is now no pulsation two inches below the axilla; the artery is there felt beating, but *not forcibly* (91 per minute), and over this part there is great tenderness on pressure; he feels rather better than yesterday; has no pain in the chest, and can take a deep inspiration without uneasiness; the pulse at the right wrist 100; rather more power than usual;

ordered a febrifuge mixture—the arm to be put into hot water for fifteen minutes.

4½ p. m. In the same state as in the morning, but has five or six times felt a sensation of throbbing in the arm, with tingling and numbness of the fingers.

10 p. m. The arm in the same state; loud bellows-sound over the region of the heart; six leeches to the axilla, and an aperient draught directly.

About five years ago he had an attack of rheumatic fever, which lasted six or seven weeks; since that period his health has not been so good as before. I have attended him several times for slight attacks of pleuritis, and for one of these I bled him, but he was not confined to his bed. The bellows-sound was always heard over the cardiac region; the heart's impulse being greater than natural.

August 10th, 8 a. m. The leech apertures have been bleeding all night, and he feels rather faint from the loss of blood, but the right pulse is not much affected by it; no pulsation in the extremity, with great tenderness over the commencement of the brachial artery; the hands not so cold as yesterday; applied caustic to the leech apertures, and ordered one of the following powders to be taken every five hours:

Powdered colchicum, five grains; Antimonial powder, half a grain; Mercury with chalk, ten grains. Mix. Divide into five powders; one every five hours.¹

11th. Much the same as yesterday; the artery painful on pressure.

Repeat the powders.

13th. Has continued in the same state since the last report; but the hand is not so cold, and there is less tenderness over the brachial artery.

Repeat the powders.

Bowels not relieved.

An aperient draught.

As he had no friends in London, and was not very comfortably situated at his lodgings, I sent him to St. Thomas's Hospital, where I visited him several times; he was placed under the care of Mr. South, who kindly furnished me with the following notes up to September 5th.

¹ Not, as stated in South's Chelius, page 75, at one dose.

14th. Has much tenderness on slight pressure from the middle of the arm upwards into the axilla in the course of the artery ; pulsation in the radial at the wrist very slight, in the brachial artery (below the spot before named) scarcely, if at all, perceptible, and only slightly above ; no pulsation in the ulnar artery ; at the right wrist the pulse is distinct, full, and quick ; bowels open to-day.

Twelve ounces of blood to be taken from the right arm. Solution of potassio-tartrate of antimony, twenty minims every four hours in a mixture of citrate of potass.

16th. Has been relieved by the bleeding ; and there is less pain and more feeling in the arm.

18th. Has less tenderness in the upper arm, and a touch produces tingling in the index and middle fingers ; probably the median nerve is affected ; complains of deadness along the outside of the fore-arm, but not in the thumb, which was affected in the same way previous to his admission into the hospital ; pulse at the wrist the same as before ; the pain at night now very trifling.

Dr. Munk examined him yesterday, and believes that there is regurgitation through the aortic valves.

22d. Has had occasional shooting pains in the index and middle fingers, as if being cut off ; no increase of pulsation at the wrist ; upper arm less tender ; complains of having had pain in the sole of the left foot for two days, since which it has extended into the great and second toes, so that he could not bend them without much uneasiness, but in the course of the day the pain subsided here, and passed to the dorsum of the foot, where it still is, although it is less painful than yesterday.

September 5th. Pulsation very distinct, though small, in the radial artery to-day.

25th. Since the last report the symptoms have varied ; very slight pulsation has existed in the radial artery (scarcely perceptible) ; he complains of pain in the left side, and is not so well as when I last saw him ; this pain came on three or four days since, previous to which he was as well as at the last report.

October 7th. Is still confined to his bed, and his health is not so good as at the last report ; slight pulsation is perceptible

in the left wrist; he has pain in the side, and his breathing is quick; the impulse of the heart is greater than usual; bruit de soufflet very distinct over the left side of the chest.

I was present at the examination of the body by Dr. Munk and Mr. South, forty hours after death. On carefully dissecting the brachial artery and laying it bare, it presented the following appearance. Immediately below the origin of the superior and inferior profunda (they were given off together), the artery was externally of a reddish hue, and was enlarged to the extent of three quarters of an inch; it then became contracted considerably for about four inches; after this it resumed its natural size. On cutting it open the enlarged part was found to contain a hard fibrinous coagulum, about the circumference of a small goose-quill; this was firmly adherent to the sides of the artery; the contracted part was quite impervious. The circulation must have been carried on by means of the profunda and anastomotica magna.

Chest.—Some old pleuritic bands on the left side, but none upon the right; the left pleural cavity contained a considerable quantity of serum.

Pericardium.—Almost universally adherent to the heart; the free portion separated with great difficulty from the visceral layer.

Heart.—Apex enlarged, wide, and round, and both ventricles increased in size; the parietes of the left thickened, whilst those of the right were somewhat attenuated; the right side perfectly healthy; the sigmoid valves of the aorta quite disabled; margins thickly beset or fringed with vegetations; the curtains of the mitral valves thickened, containing points of cartilage and bone; the aortic and mitral orifices contracted; this mainly owing to the thickening of their individual valves.

Liver.—Dark coloured, rather enlarged; in a state of hepatic venous congestion.

The *lungs* were congested and studded with a few tubercles; nothing abnormal about the brain or abdominal viscera.

Unfortunately the inner coats of the artery were not examined in this case, as it was thought desirable not to remove the coagulum, the preparation being intended for the museum. I have but little doubt, however, that the coats were injured

when the pain and snapping sensation were first felt, and had this rupture occurred in the popliteal artery, aneurismal dilatation would have been the result, instead of inflammation and obstruction. The preparation is in the Museum of St. Thomas's Hospital, and the drawing (plate V, fig. 11) is taken from it.

CASE III.

I am indebted to Dr. Lever, of Guy's Hospital, for the history of the following case;¹ which I have somewhat abbreviated. I saw the patient during her illness, and had an opportunity of examining the morbid parts after death.

"Mary Ann P., aged 19, with fair complexion, rosy cheeks, brown hair, and blue eyes, was admitted into Guy's Hospital in September, 1843, under Dr. Babington. Although considered delicate, her health had, till about eight years since, been tolerably good; when, for three successive springs, she had intermittent fever. All her family are healthy. She has now been ill a year: the bowels at the commencement of that time were much relaxed; and then the abdomen began to swell on the left side, accompanied with much pain; for which leeches were applied, apparently with benefit: shortly after, however, she experienced great pain and difficulty during micturition, which continued till within six weeks of her admission. The catamenia appeared first when she was about seventeen; and although she has generally been regular, yet on more than one occasion four months elapsed between the discharges: the tumour was always more uneasy during the menstrual periods. The pain has continued without intermission, and she has often been prevented from sleeping by a violent throb just as she was dropping off. When admitted the skin was hot and rough, tongue furred and brown in the centre, and the pulse very weak, 100. The abdomen was rounded by a hard tumour lying towards the centre, but evidently springing originally from the left lumbar and iliac regions: its exact dimensions could not then be very well defined. Her position in bed was usually on her back, extreme pain keeping her from lying on

¹ The notes taken by a pupil.

her side. Dr. Lever examined, and found that, at the upper part of the vagina, between the neck of the uterus and bladder, there was a firm hard substance obeying the motions of the uterus; the bowels are relaxed; catamenia regular at present. Low diet.

Powdered rhubarb with carbonate of magnesia, 25 grains, immediately. Ointment of iodide of potassium to be applied to the abdomen. Solution of potass, 25 minims, in infusion of gentian, three times a day.

September 15th. Looks very ill this morning; breathing difficult; auscultation gives a hoarse sonorous râle in the anterior portion of the right lung, and there is likewise a deficient respiratory murmur behind; complains of pain under the right clavicle; has had no sleep during the night.

Repeat the mixture, with fifteen drops of tincture of henbane. A blister beneath the right clavicle.

16th. The unfavorable symptoms of yesterday much abated.

October 2d. There has been pain in the abdomen for the last few days, but it is now very acute, especially at one small spot on the left side.

A poppy fomentation. Repeat the medicines.

6th. As the pain has not been relieved by the fomentation, Dr. Lever ordered six leeches to the abdomen.

9th. The parts are still very painful, although the bleeding was slightly beneficial; bowels open; tongue clean; has little or no sleep at night.

Six leeches to the painful part. Repeat the medicines.

10th. The pain is much relieved; complains of feeling sick.

16th. The inflammation has again returned so as to render the application of four leeches necessary.

17th. The bleeding has relieved the pain.

23d. The catamenia absent for six weeks; she sits up a little daily, but finds the pain in her back and loins increase.

27th. No sleep at night; catamenia appeared yesterday very scanty, only continued during the day.

Muriate of morphia, $\frac{1}{2}$ of a grain every night.

30th. Obligated to leave off the pills, as they make her sick, and do not produce sleep.

November 6th. Has pain in the lower part of the chest; no cough nor expectoration; the tumour decidedly larger since

her admission, and is very painful when touched at the lower part, on the left side close to the groin ; bowels open ; passes a proper quantity of water ; but there is great pain during micturition.

8th. Dr. Lever has examined her and found the os and all the surrounding parts quite normal ; fluctuation in the tumour is very distinct.

27th. Dr. Babington has also examined, and when the finger is in the vagina he can feel the tumour fluctuating above.

Iodide of potassium, five grains, in infusion of mint, three times a day.

December 1st. Dr. Lever again made an examination, having previously drawn off the water, and cannot feel the fluctuation of the tumour through the walls of the vagina. As her health is at present good, Dr. Lever thinks that nothing more can be done for her ; she is, therefore, to leave the hospital and become an out-patient.

15th. Having heard that Mary Ann P. was too ill to go to Dr. Lever, I went to her house, and found her in bed with severe pain at the chest, troublesome short cough, and considerable dyspnœa ; in short, all the symptoms of acute bronchitis ; tongue white and very foul ; pulse hurried ; acute pain at the lower part of the abdomen on the left side, on which part she cannot bear the slightest pressure ; bowels rather relaxed ; motions dark coloured ; a darkened areola round the eyes.

Spirit of nitric æther, half a drachm ; Solution of potassio-tartrate of antimony, ten minims ; Syrup of poppies, half a drachm. Mix. To be taken three times a day. A pill of conium and ipecacuan every night. Eight leeches to the abdomen. A fomentation.

16th. The pain in the abdomen is much relieved, and she bears pressure pretty well. She has, however, passed a bad night, and is this morning very weak.

21st. From the time of the last report she has gradually become weaker, and it was deemed necessary this morning once more to admit her into the hospital, where she is again placed under the care of Dr. Lever. She is much altered in appearance, being deadly pale and very thin, with hollow cheeks and sunken eyes, surrounded by a darkened areola ; has constant diarrhœa.

Solution of acetate of ammonia, two drachms, in infusion of serpentaria, three times a day.

22d. Rather improved this morning.

Brandy, four ounces.

24th. Pulse very low; bowels still relaxed; slept pretty well last night.

Compound cretaceous mixture.

25th. Has passed a bad night; bowels less relaxed, but is still so low that the quantity of stimulant is to be increased.

Brandy, four ounces; Port wine, three ounces.

26th. She is unable to take as much stimulus as she was yesterday ordered; the large fluctuating tumour in the abdomen has entirely disappeared,—how, it is impossible to say; perhaps (as her bowels have been much relaxed lately) the contents of the sac may have passed per rectum.

Brandy, two ounces; Port wine, three ounces.

30th. Dr. Babington has to-day examined her chest; on percussion, the left side (anteriorly) sounds slightly dull; the right normal; auscultation proves the breathing quite natural, but there is considerable brilliancy of voice; posterior region normal; complains of pain in the right foot, which is rather red.

January 1st, 1844. The right leg and foot very painful, and of a livid purple colour up to within six inches of the knee; the femoral artery cannot be felt; the limb is quite cold.

Apply hot flannels to the legs, and warm bottles to the feet.

6th. The foot is gradually becoming black and shrivelled, and she complains of a burning sensation in the limb.

Lead lotion to be applied.

9th. The inflammation is extending up the limb; and a discoloured spot has appeared on the knee, about the size of half-a-crown.

13th. The limb is painful, and very tender at the junction of the healthy and diseased parts: no pulsation is felt below Poupart's ligament; pulse 120, small and weak.

February 7th. From this date to the day of her death, she gradually became weaker, and the stomach more irritable, rejecting everything but the wine and brandy, which she took in large quantities, often a pint of the latter with a half pint of wine daily. During the few days previous to her death the vomited matter was green; the pulse averaged from 110 to 130, small and weak: tongue generally clean and moist.

15th. The limb affected was wrapped in cotton wool, which gave her warmth and more comfort.

At the beginning of March the line of demarcation was distinctly visible about four inches below the knee-joint; and early in April the bone was clearly seen on the upper surface; whilst underneath, the muscles were not completely divided. It was thought that she was too weak to bear the shock of amputation.

She died April 21st, 1844, 3 p. m., worn out by constant suffering."

Inspection, twenty-four hours after death.—The body was greatly emaciated; the large tumour which it had been conjectured was ovarian, now proved to have been a large abscess, connected with the ovary, which had burst into the cæcum; the cyst was found much diminished and indurated; but the connexion with the cæcum was distinctly marked; the right ovary was large; the uterus was lined with a thick, white, coarsely-flocculent layer, which looked like inflammatory slough; liver, very fat; tubercles in both lungs.

The inferior half of the right leg was gangrenous; and on examining the right iliac artery, there was found in it a sort of valve and tube of firm fibrine extending about four inches; the femoral artery was healthy, but grumous clots were present both in the femoral and iliac veins.

Head not examined.

It is difficult to say when the inflammatory action began in the external iliac artery, but it probably occurred a short time before the commencement of the gangrene, and subsequent to the discharge of the abscess.

It is equally difficult to ascertain the cause of the inflammation, but the small extent of artery affected as well as its contiguity to the sac, renders it probable that it was occasioned by the pressure of the tumour.

The case is a good example of the production of dry gangrene by the plugging of an artery some distance from the diseased parts; and in this respect it tends to elucidate the pathology of the case first related.

The three following cases I attended in the poor-house, Walworth, during the illness of Mr. Lowne, the parochial surgeon.

CASE IV.

Mrs. Crown, aged 84, was admitted January 29th, 1840, with dry gangrene of the right toe, extending as far as the second phalanx; the tips of the second and third toes were also black and gangrenous; and she had, previous to this appearance of the toes, suffered great pain of a shooting character; ordered yeast poultices and opium at bedtime. She died February 19th. The gangrene did not extend from the day I first saw her, but she endured intense pain, which was only relieved by large doses of opium.

I examined the anterior tibial, tarsal, and inner plantar arteries. The first, after its passage through the interosseous ligament, was hard and cylindrical; on cutting into it, a portion of lymph was found to occupy the caliber of the artery to the extent of an inch, being firmly attached to the inner coat; this membrane, throughout its whole extent, was of a deep vermilion colour, containing in various parts bony and atheromatous deposit. About an inch before its termination it was quite impervious from fibrinous coagulum, which was cord-like to the touch, and must have existed for some time; the inner plantar artery was more healthy in appearance, but the lining membrane presented patches of intense redness.

The arteries were seen by my friend Mr. Darvill, the day after their removal, when the inner lining still exhibited the vermilion tint.

CASE V.

I was requested to see Susan Brown, December 25th, 1839. She had for some days been troubled with diarrhœa, attended with frequent pain in the abdomen; the motions profuse and watery; for about a month the bowels had been at intervals in a relaxed state.

January 25th. She complained of excessive pain in the calves and fronts of both legs, extending to the hams, feet, and thighs ; but it was much more severe in the right.

There was no preternatural heat or swelling ; the pain was increased by pressure, and was so excruciating that she frequently screamed. This continued for a few days, when a black spot of some extent was observed on the outer side of the calf of the right leg ; this increased till it was as large as the hand ; it had a black, dry, and shrivelled appearance : the foot and leg became cold, and the sensibility on touch was somewhat increased ; the skin was of a livid, mottled hue.

The treatment consisted in the administration of opiates and ipecacuanha internally, with hot fomentations to the abdomen.

She died March 16th. The pain, four weeks before her death, was much less acute ; there was *no pulsation in the femoral artery* ; the pulse at the wrist varied from 70 to 90 ; the temperature of the foot and leg, below the part first attacked, less than natural.

Autopsy, twenty-six hours after death.—Mr. Darvill present. The body rather emaciated ; the right foot and two thirds of the leg of a dark livid appearance, the lower part quite black, but no sloughing has taken place. After examining the heart, about which there was nothing remarkable, we carefully removed the whole of the aorta, with the external iliac, femoral, popliteal, anterior and posterior tibial and peroneal arteries, with the femoral vein, and the state of the parts was as follows. The caliber of the aorta rather larger than usual—its inner lining presenting various patches of a vermilion tint ; the membrane darker than natural, with a few spots of atheromatous deposit ; the femoral and popliteal arteries, with their veins very large, and cord-like to the touch, arising from coagulated blood of a light brick-dust colour, very tough and firm : the coagulum in the femoral artery commenced at the origin of the profunda, but it was quite fibrinous and firmly adherent to the artery ; a portion projecting into the canal, so as to form a sort of valve over the profunda, the opening of which was pervious ; the anterior tibial artery contained a large quantity of fibrinous deposit ; its inner lining was very

red, and its lower third, between its inner and middle coats, converted into a bony cylinder about half an inch in length, not, however, entirely obstructing the canal; the posterior tibial artery was filled with fibrinous coagulum, and its upper part, the middle third, contained a large quantity of ossific deposit; the peroneal artery was healthy.

In this case hot fomentations were applied to the leg, followed by yeast poultices, with large doses of opium internally, without which she obtained no sleep, in consequence of the severity of the pain.

CASE VI.

August 11th, 1840. I visited J. B., aged 72, a brickmaker of intemperate habits. He had been subject to rheumatism, and on January 12th last, felt great pain in the calf and fore part of the right leg. He had been troubled with what he called a scorbutic eruption for some years; this disappeared, and the inner part of the ankle became red; soon, however, it assumed a blackish hue, and a large portion of the integument and muscle sloughed away, leaving a deep cavity. After this the pain ceased, and the wound remained stationary for some months, when it again became gangrenous, and he died August 12th.

I examined the *leg with Mr. Lowne fourteen hours after death*.—The right foot black and shrivelled, with slough upon the instep, and the whole inner side of the leg; the femoral artery contained various thin patches of bony deposit, and its caliber in some places was diminished; the popliteal was filled with coagulum, which, at the lower part, was dense, white, and firmly adherent to the artery; the anterior tibial was studded with numerous patches of ossific deposit, which, in some situations, extended around the artery, and almost obliterated its canal; the lining membrane of the posterior tibial was in many places bony, and its lower portion nearly effaced by a hard, white, fibrinous, substance, which appeared organized; this was within an inch of the gangrenous part.

The pain in this case was very severe at first, but it subsided after a few weeks. The treatment consisted in hot

fomentations and yeast poultices to the leg, with opium at bedtime.

The late Mr. Bryant, of Kennington, was kind enough to furnish me with the two following cases.

CASE VII.

"In April, 1833, I attended Thomas Raugher, aged 78, when labouring under gangrene of the foot and leg. It commenced with slight discoloration of the foot, which gradually spread upwards, nearly as high as the middle of the leg, still showing a disposition to enlarge its boundaries; nothing like a line of separation between the dead and living parts being produced, although his powers were attempted to be sustained by nourishment, and the part excited to a healthy reparative action by local stimuli. Notwithstanding all, however, after the lapse of a fortnight, he became the subject of tetanus and died.

On examining the limb, the femoral artery throughout its extent, and the popliteal to its division into the anterior and posterior tibial, were found plugged with adhesive matter, which in many parts was soft and broken down, as if undergoing a suppurative action; the serous lining of the artery throughout its extent bearing all the characters of inflammation, if redness (quite a vermilion colour) can be considered to describe that state."

CASE VIII.

"The second case is the one from which the preparation was taken which I exhibited at the London Medical Society.

It occurred to a man in the middle period of life, who became suddenly the subject of gangrene of the foot and leg, not preceded by pain, or inflammatory flush, but the part became discoloured, as in the other case, gradually extending in spite of all that was done to him; the knee-joint became implicated, which produced so aggravated a state of constitutional irritation as to destroy him.

The cause of mortification in this case was by no means obvious, although, from the manner in which it proceeded, I had but little doubt that obstruction existed to the supply of blood. On examination this opinion was confirmed; the femoral artery was filled with adhesive matter, and the serous lining extremely red."

CASE IX.

Mr. Linnecar, of Aldermanbury, has favored me with the next case.

"J. J., 60 years of age, in descending a flight of stairs, struck the ends of two fingers against the story-post, which produced the sensation of numbness, but did not prevent him from going to his usual employment, that of a foreman to a carrier. Three or four days after the receipt of the blow I saw him, and found the hand swollen, fingers livid, and very painful; no pulsation in either of the arteries of the fore-arm, but just above the bifurcation, the pulsation was clearly felt in the brachial artery. On visiting him next day, I found the top joints of the fingers black and shrivelled; in a few days the thumb and the whole of the fingers, with the greater part of the hand, mortified. The usual remedies were used, but without avail, the man dying in a month from the occurrence of the injury.

The body was examined by Mr. Stanley and assistants. The arteries of the arm were carefully inspected, but no diseased appearance could be detected, with the exception of a few points of bony matter at the bifurcation of the brachial artery. *A small cord of fibrinous substance occupied the cavities of the ulnar and radial arteries*, but by no means obstructed the passage of the blood through them; the heart was apparently healthy, but a large pouch was formed in the aorta, at about the commencement of the arch; the liver was much diseased, being nearly all converted into a brain-like substance; a stricture was also found in the transverse arch of the colon, which would barely admit the top of the little finger.

I had been frequently in the habit of seeing this man, and feeling his pulse in the right arm (the one affected), therefore

the absence of pulsation must have been produced by the blow. The arm would have been amputated had his general health been better. The post-mortem fully justified the course adopted."

CASE X.

The subjoined case, abridged from the second volume of 'Guy's Hospital Reports,' bears a great resemblance to the foregoing.

"October 7th, 1836. A. B., aged 18, was admitted under Mr. B. Cooper, with dry gangrene of the hand. Whilst planning a piece of wood, about three weeks before this time, he struck the finger forcibly against a piece of lead; the day after it had a bruised appearance, and felt cold and numb; on the second day the fingers became painful, and were cold and shrivelled.

Treatment.—Opium at bed-time; ammonia and tincture of lavender three times daily; lotion of acetate of ammonia and spirits of wine. The brachial artery at the upper part feels somewhat cord-like, and on tracing it downwards more so, the first two inches of the radial artery solid, and about three inches above the wrist; the ulnar artery also solid about three inches above the wrist; severe pain when the course of the artery is pressed upon. Mutton chops and porter; flannel to the arm. The fingers and hand were affected with dry gangrene, and Mr. Cooper removed the hand at the radio-carpal joint thirty-five days after his admission; no arteries bled, as the radial and ulnar were filled up with coagula; the stump at first put on an offensive appearance, but ultimately healed, and he was discharged from the hospital two months after the operation. Arteries of the hand not examined."

This and the ninth case are, I think, examples of arteritis from injury to the smaller vessels. The inflammation probably extended into the radial and brachial arteries, and produced the plugging and consequent absence of pulsation.

I am indebted to Mr. Adams, of Broad street, formerly dresser to Mr. Green, St. Thomas's Hospital, for the following case, which I have considerably abbreviated.

CASE XI.

“ William Connor, a strong, healthy countryman, aged 45, was operated upon by Mr. Green, September 5th, 1834, for popliteal aneurism. On opening the sheath of the femoral vessels, a small artery was divided, which bled very freely ; and it became necessary to enlarge the opening in the sheath to secure it. Mr. Green thought it prudent to employ two ligatures, and divide between them. Soon after the operation the temperature of the leg and arm was much reduced.

6th. The foot presents a livid appearance ; frequent pain in the leg, of a pricking and darting character.

7th. The foot shrivelled, with several purple spots on the surface ; the veins turgid, and when emptied, are slow in re-filling ; two broad blue stripes extend up the leg.

8th. Slight sensation about two inches above the malleolus, increasing toward the tumour, over which the skin is so sensible that the slightest touch produces excruciating pain.

10th. The foot and leg look like a limb that has been for some time in the dissecting-room.

15th. The leg almost black on the outer side, with numerous vesications ; complains of severe pain at intervals.

16th. Sensation extends only to about the middle of the leg.

18th. The mortification having spread during the night, and there being much swelling, heat, and redness, above the knee, amputation of the upper part of the thigh was performed ; *no satisfactory examination was made of the leg.*

December 2d. Stump quite healed, and health good.

The treatment in this case consisted of nourishing diet, porter, opium, and ammonia, with poultices to the leg.”

This case is interesting, as showing the similarity of dry gangrene produced by ligature, and the same disease when the result of arteritis from a blow or other external injury. I believe that the diminished supply of blood, produced by the ligature of the artery, is not of itself sufficient to account for the gangrene ; and that the occurrence of arteritis, affecting the collateral branches, affords a more probable explanation.

CASE XII.

Mr. Bottomley, of Croydon, furnished me with the under-mentioned case.

“ Mary Matthews, aged 39, was confined February 8th, 1838. Her general health during pregnancy was good, till within two months of her confinement, when she became subject to cough and great general debility; the probable result of cold, and the want of proper nutriment; she being able only to procure a small quantity of animal food once a week, and that, bacon.

Her labour was expeditious; the child being diminutive; it died twenty days after its birth. The mother continued to do well for ten days, when she became the subject of pleuritis, for which she was bled, leeches, and blistered, and recovered from the attack very speedily; but a few days afterwards, she complained of a severe pain in the heel, taking a course towards the great toe; the external appearance was healthy, and warmth of surface natural. Presuming it to be a severe neuralgic affection, the veratrine ointment was plentifully applied; internally, large doses of the acetate of morphia; fomentations and a variety of external means were used without benefit. After several weeks of suffering, a livid spot appeared on the inferior part of one of the toes; the temperature of the foot at the same time became gradually reduced, accompanied by diminished sensibility; an augmentation of pain succeeded, but the sensibility became less; the livid spots increasing in number, and extending their boundaries, till all the toes were perfectly black, and this continued till the foot and ankle were involved in the mortification; a well-defined line of demarcation appeared about two inches above the ankle-joint. During this process she was well supplied with wine, beer, meat, &c.

Her health suffered so much, that the removal of the limb was deferred for some time, and it was not till the 2d of May that it was so far restored as to allow of the operation being performed; notwithstanding that the line of demarcation was well defined two inches above the ankle-joint, the calf of the leg being tumefied, and rather painful, and the cause

of the disease constitutional, it was deemed advisable to amputate the limb above the knee. After its removal, *both the femoral artery and vein were found completely plugged* with a semi-cartilaginous, transparent, elastic substance. By way of security, a ligature was put upon the femoral artery, and the stump dressed, with but faint hopes of success; upon the removal of the first application, it was found that adhesive inflammation had taken place at the angles; the integument and parts around the femur sloughed, denuding the end of the bone. After a few weeks a healthy action was established, and it now became necessary to remove a still further portion of the femur, by taking away some of the unhealthy soft parts, and passing a long double-edged bistoury round the bone, retracting the integuments so as to saw off about an inch and a half; the covering was again brought over the end of the bone, and the stump healed almost immediately. The patient quite recovered, and is now in perfect health."

CASE XIII.

November 28th. I visited Mrs. G., an old woman who has enjoyed good health, with the exception of occasional attacks of rheumatism, which have of late been more frequent.

About six weeks since she complained of great pain in the right calf and ham, extending up the thigh; the leg below the knee became oedematous, and in the middle of the calf appeared as if girt by a ligature; the upper part being double its natural size, the lower not much larger than usual; there was a small ulcer on the constricted portion, from which serum oozed in large quantities; she was unable to bend the leg; and when I first saw her, she had been in a sitting posture for five days. She continued in this position for three weeks, when she became so exhausted, that she was obliged to remain on the bed, although she complained that the recumbent position gave her great pain. On pressing the popliteal, and lower part of the femoral arteries, the pain, which was of a darting character, was much increased, extending up the thigh and down the calf of the leg.

After a few days the ulcer assumed a gangrenous appearance ; the leg became rather shrivelled, and she died on the 19th of December. The treatment consisted of hot fomentations to the thigh and leg ; anodynes at bedtime, with decoction of bark and nourishing diet ; the state of the circulation I thought would not admit of depletion.

December 20th. I removed the femoral artery and vein with the posterior and anterior tibial arteries ; the femoral artery throughout its extent was covered with bony and atheromatous deposit ; its caliber in some parts being much diminished, particularly near its termination, where there was a small cylinder of fibrine unattached to the lining membrane of the artery ; in many places the atheromatous deposit was quite soft, and appeared of recent formation ; about two inches from its commencement the popliteal artery was obstructed by a soft cheesy deposit, situated between the inner and middle coats ; its length one sixth of an inch ; the femoral vein was filled with coagulated blood, not so dense and fibrinous as that in the artery ; the lining membrane both of the artery and vein was of an intense red. (Prepar. 1624, College Museum.)

This case differs from those before related, in consequence of the presence of phlebitis, a condition which fully accounts for the swollen state of the leg.

CASE XIV.

The subjoined case was under the care of my friend Mr. B. Evans, who allowed me an opportunity of seeing the patient during life, and also of inspecting the body after death.

Mr. —, aged 52, a retired publican, of intemperate habits, five feet seven inches in height, applied to Mr. Evans, October 19th, 1844, in consequence of severe pain and swelling in the left great toe. He had enjoyed good health until about five years since, when he was thrown from his cart ; after this his eyesight became dull, cataract formed in both eyes, which were operated upon by Mr. Guthrie, the sight being slightly improved by the operation ; but he was unable to read for two

years and a half; his bowels were in a relaxed state (four or five motions daily); three months since the diarrhoea ceased, and the bowels became constipated; he had been in the habit of drinking large quantities of gin and brandy for many years; but during the last five years he has been more temperate.

Redness and swelling of the great toe, accompanied by severe pain up the leg, were first observed; a small black spot then formed, which gradually extended.

November 22d. The foot is of a jet black colour as far as the ankle; the sphacelated part rather dry, and shrivelled; the skin, above the line of demarcation, presents a natural appearance; pulsation can be felt in the femoral artery as low as the opening in the triceps; it is absent in the popliteal; the pulse at the wrist feeble (90); there is frequent twitching of the muscles, with anxious countenance, &c.

He died November 23d. Mr. Evans says, "there appeared to be great want of power from the commencement."

Treatment.—This consisted in the administration of opiates: ammonia, camphor mixture, bitter infusions, gin, &c.; beer-grounds poultices were applied to the gangrenous part.

Autopsy, 24 hours p. m.—The heart rather larger than natural; valves normal; the lining membrane of the arteries throughout intensely red, with patches of bony and atheromatous deposit in various parts; the right internal iliac, before giving off its branches, was completely obstructed by a firm, fleshy-looking, fibrinous coagulum; the left also much reduced in size by atheromatous deposit between the inner and middle coats; the femoral artery much diminished in caliber below the profunda, by a deposit of atheroma two inches in length; the popliteal before its division was filled with dense fibrinous coagulum, but not entirely impervious; the anterior tibial at its origin contained a cylindrical deposit of soft lymph adherent to the vessel; about half an inch below this was a small cheesy-looking coagulum, and the artery beyond was converted into a ligamentous cord, quite impervious; the posterior tibial artery not examined; the internal membrane of

the femoral vein much reddened ; the valves filled with dark coagulated blood ; the liver rather white and granular ; the abdominal viscera normal.

I could add many cases of a similar description to the foregoing, but they are, I think, sufficient to show that dry gangrene is, in most instances, occasioned by arteritis of an acute or sub-acute character ; this inflammation producing coagulation of the blood, and a deficient supply of this fluid to the gangrenous parts.

CHAPTER IV.

ARTERIAL DEPOSITS.

It is supposed by many that the changes I am about to describe are not the result of inflammatory action, but that they originate in a loss of nutrition or in a diseased state of the blood. As I have before said, until we are better acquainted with the essential characters of inflammation, this question must remain undecided. I have no doubt, however, that the various deposits are preceded by a congestive, if not by an inflammatory, state of the coats, and therefore we are warranted in classing them amongst the inflammatory products.

Those who deny the existence of vessels containing red globules in the inner tunics, must allow that these tunics contain both the fibrinous and serous portions of the blood; and that these materials are sufficient to produce the deposits in question.

Chronic inflammation of the arteries is not so easily recognized as the acute, although its effects are both various and permanent. The most common, viz. redness, softness, increased thickness and brittleness of the internal coats, with the formation of adventitious matter under the serous membrane, are seen in the accompanying preparations, 3, 6, and 7. The deposits are atheromatous, semi-cartilaginous, cartilaginous, calcareous, and bony. They generally take place in patches, varying in size, form, consistence, and elevation, and are always, I believe, situated in the subserous coat, the inner membrane, in many specimens, being easily removed. I have never found these deposits in the fibrous layer, although in dried specimens they appear to occupy this part. In the accompanying preparation 10, (plate IV, fig. 3) the serous and subserous coats are removed; the latter is seen to contain the atheromatous matter, the fibrous being unchanged in structure. The serous coat is sometimes so firmly attached to the subserous, that it cannot

be separated. The morbid appearances observed in the former are, brittleness, opacity, and want of lustre (the natural polish and smoothness being lost); redness, deposits of lymph, and breach of continuity from rupture. I believe that ulceration does not often occur in this membrane, and that the breaches of surface so frequently seen in it arise from rupture, and not from the ulcerative process. The preparations 1610, 1611, 1612, and 1613, in the College Museum, are good examples of this. The inner coat is seen elevated, and broken by thick deposits of bony and atheromatous matter. In the numerous examinations I have made of diseased arteries, I have not met with an instance of ulceration of the serous membrane. It is not uncommon to find this membrane absent where bony patches exist; but we have no grounds, I think, for assuming that it is destroyed by ulceration. The fibrous coat is sometimes reddened and softened, and in old age it is preternaturally dry, a condition which sometimes occasions partial loss of cohesion and rupture. This coat, like the parietes of the ventricles, is subject to hypertrophy, and attenuation without change of structure. The former I have frequently observed in apoplectic subjects, who have laboured under hypertrophy of the left ventricle. In one specimen in my possession, the yellow tissue in the ascending aorta and arch is double its natural thickness. The only morbid changes I have noticed in the cellular coat are, congestion and breach of surface, sometimes producing aneurism of the internal coats; this occurrence, however, is very rare. It is likewise thickened by deposits of lymph and effused blood. Like the fibrous, this coat may be preternaturally dense; or, its fibres may be weak and yielding; it is also occasionally destroyed by external ulceration.

My attention has been directed to the frequent occurrence in young subjects of a white opaque deposit along the origins of the intercostal arteries; the spots are generally small and numerous, often linear (plate III, fig. 4, and the accompanying preparation 1627 Museum Catalogue), the lines usually corresponding with the course of the artery. The membrane around these spots is seldom altered in colour, sixteen cases, (1, 4, 7, 15, 24, 25, 27, 36, 37, 47, 48, 50, 51, 56, 59, 102), reported in the table, are examples; twelve of them occurred

in subjects under twenty-six years of age. The deposit, when seen under the microscope, presents a granular aspect, and appears to contain a small quantity of phosphate of lime. Oil-globules were found only in two of seven specimens which I have examined. In another instance (Case 64), where the deposit had an elevated, fatty appearance, numerous oil-globules were present. I have not been able to determine satisfactorily whether these white spots ever become bony or cartilaginous, but I am inclined to think that they do not. Hasse¹ believes, "that the semi-cartilaginous patches are invariably seated on the free surface of the artery, and never between the membranes; whilst the atheromatous deposit originates between the internal and middle membranes, or else between the fibres of the latter." Rokitsansky² asserts, "that these deposits are upon the inner coat, and are endogenous products of the blood, arising from a diseased condition of this fluid." It may be thought presumptuous in me to dispute the correctness of the opinions of two such celebrated pathologists, especially those of the latter, who is said to have examined twelve thousand bodies. This matter, however, I apprehend, is not to be determined by the number of inspections, but rather by the manner in which they have been conducted. I have made very numerous and careful examinations of the various deposits, and in every instance I have found them, whether atheromatous, cartilaginous, or bony, under the serous membrane. In many cases I have not trusted to my own observations, but have been assisted by others, who have arrived at the same conclusion. In Case 74 (Table of Arteries) some of the patches were soft, creamy, and elevated; and on a superficial examination, appeared to be on the surface of the serous coat. They were examined under the microscope, (soon after the artery was removed from the body, by Mr. Rainy, whose opportunities of investigating morbid structures, microscopically, have been very extensive,) and the deposit, which contained numerous oil-globules, was seen beneath the inner coat, when a transverse section was made. In addition to the foregoing observations, it appears to me that there are other circumstances which

¹ Pathological Anatomy, translated by Swaine, p. 77.

² Handbuch der Pathologischen Anatomie.

militate materially against the views promulgated by these German pathologists. If these formations were deposits from the blood circulating in the vessel, the anterior part of the aorta would seldom be affected ; but in several instances I have seen this portion of the vessel more diseased than the posterior, although, I admit, that these were exceptions to the general rule. Again, if the blood must be in a morbid condition, why are the vessels carrying black blood not affected where the circulating fluid remains longer than in the aortic system ? In Case 57, the blood was highly diseased, and probably had been so for a long period ; but no trace of deposit could be seen in the arteries of the chest and abdomen. Lastly, if the deposit is endogenous, why does it occur in patches varying in form and situation, and why does it affect a particular part of the vessel ? It is quite true that some of these deposits commence most frequently along the origins of the thoracic intercostals, and they are generally most abundant where branches are given off ; but this I believe arises from the greater wear and tear of the vessel at these parts, the consequent weakening of its fibres and the greater tendency to congestion.

Mr. Gulliver, in the twenty-sixth volume of the 'Medico-Chirurgical Transactions,' says, "I have found all diseased arteries to contain oily globules, and an abundance of cholesterine."

Amongst the deposits, he mentions the white, buff-coloured, opaque spots of the inner membrane, and the soft matter usually called atheroma. He adds, "the tunics of ossified arteries, as well as the bony plates, are often pervaded with the substances above named ; and this fatty degeneration of the tunics of the arteries is generally connected with that state of them, which is the most frequent cause of aneurism, as well as their obstruction, occlusion, or wasting in aged people.

I am disposed to think, that this fatty deposit is not essential to the various diseased conditions of the arteries. I have not seen it in the cartilaginous, nor is it generally present in the white structures in the arteries of young subjects before alluded to. Some of the atheromatous patches contain a large quantity of fat-globules, but I see no reason why they should on this account be called "fatty deposits," as the fat is much less abundant than the other constituents ; a fact which may be easily ascertained by boiling these deposits in ether or alcohol.

The coats of the arteries of old people, like their bones and other parts, contain so much fat that it is not to be wondered at that the deposits in question are generally impregnated with this material, and it may rather serve, by its lubricating qualities, to prevent a preternatural dryness of the arterial tunics; and the well ascertained fact, that the occurrence of aneurism is less frequent when the fatty condition becomes more prevalent, serves to strengthen this hypothesis. I have seen numerous oil-globules in a dried aorta from an old subject, the structure of which appeared perfectly healthy. Munroe called the fibrous coat of the artery the "fatty coat." Mr. Smith, in the nineteenth volume of the 'Dublin Journal,' relates two cases in old people, where free oil was found in the blood. In the first case the patient, æt. 90, "died from rupture of the left ventricle (fatty degeneration of the parietes), the vena cava inferior gave exit to nearly a tablespoonful of a clear, perfectly transparent, limpid oil, followed by the blood of the vein." In Case 103, Table of Arteries, fat-globules were seen in great abundance on the mesenteric veins.

Becquerel and Rodier believe that the quantity of cholestérine in the blood increases as we advance in age; and they observe—

"Les faits que nous possédons ne sont pas assez nombreux pour nous permettre d'établir d'une manière définitive l'influence de l'âge. Nous pouvons seulement dire d'une manière générale, que cette influence s'exerce principalement sur les globules. Chez l'homme elle est peu marquée, et le maximum du chiffre des globules paraît restés le même de vingt à soixante ans. Chez la femme, l'époque où commence à s'établir la menstruation, et celle où cesse cette fonction, sont les limites de l'influence de l'âge. . . . Dans les deux sexes, la cholestérine augmente de proportion dans le sang, à mesure qu'on avance en âge. Cette influence ne commence à se faire sentir que de quarante à cinquante ans."

¹ Comptes rendus de l'Académie des Sciences, tom. xx.

OSSIFICATION.

This condition of the arterial tube is generally the termination of some of the foregoing lesions. Thus, the spots are first cartilaginous or atheromatous, and afterwards ossific matter is deposited. I have seen the following appearances in the arteries of persons above forty years of age, viz., red, elevated, soft patches, some of these proceeding to a cartilaginous state, containing a small portion of ossific deposit; whilst others were half ossified or formed solid concave plates of bony matter. The bone is generally in patches, which do not surround the artery. In some cases this ossified matter is present in great abundance: this is well shown in the preparations at the College (1617, 1628, 1629) from the collections of Messrs. Liston and Howship. The deposit is sometimes, though rarely, in the form of rings (College prep. 172). In one specimen, the matter is seen like grains of sand under the inner coat of the vessel. Writers on this subject appear to think that if bony deposition takes place to any extent, the elastic property of the vessel must be entirely destroyed. This error has probably arisen from the inspection of dry specimens, in which the patches become consolidated, and sometimes overlap each other. If the arteries be examined soon after death, the intervening substance will be found to retain its elasticity. The seat of these deposits is various, and large portions of the artery may be perfectly free from them, whilst others contain them in great abundance. I have recently examined the body of a woman, eighty-four years of age, in whom the ascending aorta was in a normal state; but the abdominal and thoracic portions were covered with bony patches. Many persons have lived to a great age, in whom these lesions have existed to a large extent. I think, whether this condition is the effect of inflammation or otherwise, it may be often looked upon as the result of the wear and tear which the arteries, like the other parts of the body, are subjected to; and probably it is a wise provision of Nature to accommodate the circulatory apparatus in old age to the lessened supply of blood required by the secretory organs. These depositions are comparatively unfrequent in the young,

although instances are recorded of their occurrence at an early period of life. Ossific and calcareous deposits take place in other parts of the body. I have a specimen in my collection of several large patches of egg-shell deposit on the arachnoid of the spinal cord; another of the peritoneum covered with numerous bony elevations. The pericardium, pleura, dura mater, the capsule, and crystalline lens, thoracic duct, larynx, and trachea are sometimes ossified. The testicle is occasionally converted into bone; Dr. Baillie¹ met with a few instances. I have in my possession a large testicle of a ram from Mr. Langstaff's collection, completely ossified; and at the Museum of the Veterinary College the greater part of the lungs of a horse is seen in the same condition. Hasse² found ossification of the deltoid in eighteen recruits out of six hundred who had entered the service within twelve months. The ossific deposits varied in size from a pea to a goose's egg. Mr. Lyons³ has related a case of rapid ossification of nearly all the fibrous tissues of the body; but we have no examples of the conversion of fatty matter into bone.

Melanosis.—In three instances (Cases 68, 84, 86, Table of Arteries) melanotic matter was seen under the serous membrane in several places. I am not aware that this deposit in the arteries has been noticed by any preceding writer.⁴

CEREBRAL ARTERIES.

The cerebral arteries are frequently thickened, and sometimes entirely obstructed, by atheromatous and cartilaginous deposits: these are more commonly found in persons of advanced age; but I have met with them in individuals under forty.

The deposit is generally of a yellowish colour, of a cartilaginous consistence, and is situated under the serous coat. In three instances, in which I have placed this adventitious sub-

¹ Morbid Anatomy.

² Med. Chirurg. Review, vol xxii.

³ Lancet, 1831.

⁴ Since this was written, I have learnt that Cruveilhier, in his 'Anatom. Patholog.,' mentions this deposit; I have not, however, been fortunate enough to find the passage.

stance under the microscope, no fatty matter or oil-globules were present. This deposit frequently diminishes the caliber of the artery so much, as to interfere materially with the circulation of the blood. I have never seen the cerebral arteries like those of the extremities converted into bone; and I apprehend that this alteration is of rare occurrence, although the term "ossified" is constantly used. In one example, the patient was ninety-five years of age. The arteries were described in the Museum Catalogue as bony, but on cutting into the deposit no ossific matter was discovered.

These changes, I believe, like those before described, originate in a slow inflammatory process: the arterial tunics in consequence losing a portion of their elasticity, and hence their liability to rupture and the production of apoplectic extravasations. But few instances of this disease will be found where the cerebral arteries are in a normal state. The most common seat of apoplectic extravasation is the corpus striatum or its contiguous parts. Thus, M. Rochoux,¹ in forty-one examinations of apoplectic subjects, found, in twenty-seven, the extravasation in this situation. Andral,² in three hundred and eighty-six dissections, states, "that in two hundred and ninety-eight effusion had taken place in the substance of the hemispheres, on a level with the corpora striata and optic thalami, or into these bodies." So that we may infer, that the anterior and middle cerebral arteries, or some of their branches, are those most frequently ruptured.

Softening of the cerebral substance is supposed by some to be another effect of diseased vessels; whilst others contend that it is the result of recent inflammatory action. A review of the various opinions upon the subject would be foreign to my purpose, and would lead to no practical result. A wider field of investigation must be entered into before we can arrive at anything like definite conclusions upon the subject. As regards the aged, in whom the vessels are often found in a diseased state, as in Rostan's³ cases, it is fair to infer that these changes have a direct influence in the production of the disease: although ramollissement may arise from a deficient supply of

¹ Recherches sur l'Apoplexie.

² Précis d'Anatomie Pathologique, p. 758.

³ Recherches sur le Ramollissement du Cerveau.

blood, in all probability the vessels around the softened part are obstructed by fibrinous coagula, the effect of recent inflammatory action.

In the first volume of the 'Guy's Hospital Reports,' Dr. Bright has published several cases of paralysis, and softening of the brain where the arteries were found considerably diseased: lethargic somnolency and fixed pain in the head were the most prominent symptoms. And after relating the cases, he says, "I shall now venture one step further into the path of a somewhat conjectural diagnosis, by stating, *that in those cases where disease of the vessels is attended with unusual symptoms of lethargy, and the superficial pain of the occiput is less observable, it is, in my opinion, probable that the disease has been situated chiefly in the internal carotids and their branches.*"

These deposits, I conceive, are not unlikely in some cases, where they interfere materially with the circulation, to affect both the functions of the eye and ear; in the former perhaps leading to partial or total blindness, and in the latter to the impairment of the auditory organs. A case¹ occurred to me some years since, which first directed my attention to this subject. A lady, forty years of age, who had been deaf for several years, died under my care, from softening of the brain. The basilar artery was found nearly impervious to the extent of half an inch, from atheromatous deposit, so as to occasion an imperfect supply of blood to the labyrinth. I am not aware that the above causes have been alluded to by writers on the diseases of the eye and ear; but I think that hereafter they may not be found very unfrequent ones.

CORONARY ARTERIES.

The coronary arteries are often affected with ossific and atheromatous deposits, and, up to a recent period, it was supposed that the former disease gave rise to angina pectoris. An irregular supply of blood to the heart, which an ossified condition of vessel will probably occasion, must materially interfere with its functions, and produce, under certain circumstances,

¹ Lancet, 1840. Cases of Cerebral Disease.

inordinate action. Many morbid changes, however, about the valves and aortic orifice may occasion the same symptoms, and it is impossible to discriminate between them. The coronary arteries, moreover, are seldom ossified, without the same deposit being present in the aorta or its valves. I have met with only two cases in which the coronary arteries were alone implicated; the first was a female, fifty-two years of age, who suffered from angina pectoris for several years before her death. On inspection I discovered both the coronary arteries and their branches ossified, the left ventricle hypertrophied, and all the valves healthy.

The subject of the second case (which occurred recently) was a gentleman whom I had attended for several years; he died suddenly of this disease, in his sixty-first year (his father died from the same cause when fifty-five years of age).

The heart was large and flabby; the semilunar valves healthy; the mitral opening large. Both coronary arteries, including the large and small branches, were ossified to a considerable extent, so that the muscular structure of the heart must have been but imperfectly supplied with blood. The ascending aorta contained a few small bony plates, with numerous patches of atheroma; a few small atheromatous spots were also present in the pulmonary artery.

Dr. Copeland,¹ who has made notes of nearly one hundred cases, collected from various authors, says, "about seventy were upwards of fifty years of age, and seventy-nine out of the number were males; nearly one half of them terminated fatally, and nearly the whole of them suddenly. In about fifty of those which were fatal, forty of them presented some degree of disease of the heart or large vessels, most frequently ossification of the valves, coronary arteries, and aorta, and softening and emaciation of the heart; but whether these lesions are rather the consequence than the cause of the disease, may be disputed."

Another consequence of adventitious deposit in the smaller arteries is atrophy, or wasting of organs. Dr. Carswell² speaks of atrophy of the brain, uterus, ovaries, testicles, and spleen, from fibrinous and ossific deposit in the arteries supplying these

¹ Dictionary of Practical Medicine.

² Pathological Anatomy.

organs. Dr. Wolff¹ relates a case where he found the pancreas small, hard, and of a greyish colour; the arteries supplying it were all ossified.

It is very probable, I think, that a vast number of structural changes have their origin in inflammation of the smaller arteries and capillary tubes producing obstruction, deficient supply of blood, and the formation of amorphous and imperfectly organized products.

¹ Lancet 1836.

CHAPTER V.

DISEASES OF THE AORTIC VALVES.

THE limits of this treatise will not enable me to enter so fully into this subject as its importance demands, for, although disease of the valves may not be considered to come immediately under the province of the surgeon, their various lesions, in a diagnostic point of view, are of great importance. The diseases of the aortic valves are so often complicated with structural changes of the mitral valve, as well as with other lesions of the heart and pericardium, that I shall content myself by giving a sketch only of their morbid alterations and symptoms, adding some occasional remarks, and introducing a few cases which, I think, have a practical bearing on the subject. For a more detailed account of this class of diseases, I must refer the reader to the many excellent works on diseases of the heart, both British and continental. I apprehend that few surgeons would now undertake the performance of serious operations without first ascertaining the condition of the heart and its valves; and I believe that the neglect of this precaution has added much to the fatality of surgical operations. The investigation, I admit, is beset with difficulties; and it often becomes a nice point to decide as to the amount of disease which should preclude the use of the knife. The following morbid alterations of the aortic valves I have seen either in my own practice, or in the various museums I have visited.

1st. Acute inflammation, shown by redness and deposit of soft lymph, and in most cases connected with endocarditis.

2d. Thickening and inflammatory adhesion. Simple thickening of the fibrous tissue is very common, and sometimes almost entire destruction takes place from inflammatory adhesions, so that no obstacle is opposed to the retrograde current of the blood. In a few examples (Guy's Hospital Museum

1418³³) two valves are united into one, and this condition is sometimes congenital (1430⁶⁰).

3d. Cartilaginous, atheromatous, calcareous, and bony^r deposits, commencing in the fibrous tissue, and generally more abundant at the bases and free margins of the valves, these varying much in size. In some rare instances (pl. IV, fig. 10) the valves are converted into bone, leaving a mere chink for the passage of the blood. The ossific deposit, when it occurs in the valves, is sometimes smooth and solid, at others, granular and irregular.

4th. Vegetations. These resemble the venereal warty excrescences ; they vary much in size and consistence. Some-time they are solitary, but more frequently in masses of a fringed or cauliflower-like appearance ; they are often attached to the free margins of the valves ; in other instances they cover the whole surface, and occasionally project a considerable distance into the ventricle.

5th. Retroversion and inversion of the borders.

6th. Enlargements and universal dilatations.

7th. Ruptures, in some cases commencing at the margin, and passing downwards, or forming apertures in the curtains of the valve, or several apertures are sometimes present, so as to present a retiform appearance.

8th. Aneurismal or partial dilatation.

The aortic valves are rarely affected with aneurismal dilatations. There is a preparation of this kind in the Museum at St. Thomas's Hospital, and the following is an abbreviated history of the case from the Museum Catalogue.

J. S., aged 45, was admitted December 26, 1843. Although intemperate, he had enjoyed good health, until seven months before his admission, when he suffered from what he called "inflammation of the chest," with cough, pain in his side, and difficulty of breathing ; he was bled from the arm, and took medicine which purged him ; was sufficiently well to return to his employment, and his health continued good until within two months of his admission, December 23d, when his pulse was full (100), and rather compressible ; the heart's action regular ; the rhythm natural ; the impulse feeble, but with sounds clear ; the diastolic murmur very loud and distinct ; his appetite failed him, and he had pain in the arms and legs ; the

urine became copious ; afterwards muddy and scanty ; the legs began to swell, and he died with general dropsy in February 1844.

An aneurismal dilatation is seated in each of the aortic valves ; one the size of a millet seed ; another that of a pea ; and a third as large as a horse bean. There is no preternatural thickening of the valves, and the tunics appear to be entire.

The liver was enlarged, indurated, and mottled ; kidneys large, flabby, and congested. Tunica propria separated with difficulty.

I have seen a similar instance of valvular aneurism in the Chatham Museum, and another is related by Dr. Henderson, in the 15th volume of the 'Dublin Journal.'

Causes.—The above-named lesions have been, I think, rightly ascribed by most writers to the effect of acute and chronic inflammation. Rheumatic endocarditis is a very frequent cause of the vegetations and thickenings of the aortic valves ; and I have seen several examples of these changes in young subjects, who have died from the effects of rheumatic metastasis. The various deposits also have their origin probably (as in the arteries) in a slow inflammatory process, produced by irregular action of the heart ; the constant wear and tear of the curtains, and their overstraining from sudden and violent contraction of the ventricle ; I doubt whether mercurial preparations (as supposed by some authors) have had any influence in the production of these lesions.

Symptoms and Diagnosis.—The effect of these changes is to produce various mechanical obstructions to the flow of blood from the ventricles ; the function of the valves being frequently so much altered as to allow of regurgitation of this fluid ; in other examples, the aortic orifice is so obstructed as scarcely to admit of the passage of one sixth of the usual quantity of blood. The symptoms, as may be supposed, are produced principally by an irregular distribution of the circulating fluid ; the most usual are the following : palpitation of the heart ; dyspnœa (increased by mental and bodily exertion) ; in aggravated cases, difficulty in lying in the horizontal position ; start-

ings in sleep; œdema of the lower extremities, followed by dropsy of the abdominal or thoracic cavities; congestion of various organs, producing apoplexy, angina pectoris, asthma, disease of the lungs, liver, kidneys, &c.

On the application of the ear or stethoscope to the region of the heart, abnormal sounds in many cases are heard, which have been described by authors as the bellows, rasping, sawing, filing, whistling, and cooing sounds. Purring tremor is sometimes present. These sounds will, of course, vary according to the nature of the obstruction, the size of the aortic orifice, and the state of the circulation.

Although in many cases, the chief structural alteration is in the aortic valves, these lesions, as I have before observed, are so frequently complicated with heart, lung, aortic, and pericardial diseases, that an accurate diagnosis is sometimes extremely difficult, and, indeed, often unattainable. The great attention, however, which has of late years been paid to the physical signs of cardiac disease, has enabled us, in many instances, to arrive at a right prognostication; and I have witnessed numerous examples where the diagnosis in these affections has been fully verified by the post-mortem appearances.

Persons affected with disease of the aortic valves, will not unfrequently die suddenly after eating a hearty meal, although the amount of valvular disease is comparatively slight. The distension of the stomach producing pressure on the inferior cava and diaphragm, and consequent interference with the function of the heart, will, I think, afford the most probable explanation. The three undermentioned cases are examples of this. The brain was not examined in the last two, but I think the suddenness of the deaths combined with the valvular disease, is sufficient to warrant the assumption that important brainular lesions did not exist.

CASE I.

February 21st, 1833, J. M., aged 35, died suddenly after eating a hearty dinner. He was very intemperate, and had led an irregular life, and for some years had been subject to

palpitation of the heart. He had been employed for the last seven or eight years in a gas manufactory, where he was working several hours, prior to his death, exposed to the effluvium arising from the gas.

I examined the body forty hours after death. The brain and its membranes healthy; the vessels of the dura mater rather turgid; the parietes of the left ventricle of the heart considerably thickened, one of the chordæ tendineæ as large as the little finger of an adult; the aortic valves ossified, with irregular elevations on their free edges; the lining membrane of the commencement of the aorta softened to the extent of two inches; the right auricle and ventricle healthy, with the exception of slight dilatation of the latter; the lungs and other parts normal.

CASE II.

December 16th, 1838, I was called to see a boy, aged 15, who had dropped down dead whilst at chapel. He had eaten very heartily at tea an hour before, and appeared in his usual health and spirits when he left home. He had been subject to occasional palpitations of the heart, coming on generally after any sudden mental or bodily excitement.

Inspection 56 hours p. m., with my friend Mr. Darvill, who had also been called to the case.

The body well formed and muscular; lungs healthy, but rather more congested than usual; the pericardium presented a normal appearance; the heart large, arising from hypertrophy of the left ventricle; the aortic valves cartilaginous, much thickened, and their semilunar form destroyed by irregular fibro-cartilaginous deposit on their free margins; the ascending aorta, as far as the arch, was dilated to nearly double its natural size. The abdominal viscera healthy; the stomach was distended with flatus and half-digested food in a pultaceous state, the mucous lining at the cardiac end having a fine rose tint; a large quantity of thick mucus covered its surface. The membrane was *entire*.

I could not obtain any previous history of this patient, but,

from the state of the aorta and its valves, regurgitation must have taken place to a great extent.

CASE III.

April 20th, 1830, I examined the body of Mr. G., aged 35, who died suddenly yesterday morning. A short time before his death he had eaten a hearty meal of meat and greens. He was a painter by trade, and had been subject to gout and occasional fits of dyspnœa. I found the heart much enlarged from hypertrophy of the left ventricle. The semilunar valves partly ossified, as well as a portion of the lower part of the ascending aorta. Lungs healthy: about half a pint of fluid in the stomach, mixed with meat and greens. The mucous membrane of this organ was softened, and presented a blush of inflammation which occupied the whole of the cardiac extremity. The kidneys very small, but healthy; the remaining abdominal viscera normal. Brain not examined.

The two following cases show the great importance of avoiding, in most instances, all depressing measures in the treatment of valvular disease; a patient labouring under permanent patency of the aortic valves, will seldom bear medicines of a lowering description, and I fear that the administration of digitalis in this condition of heart has not unfrequently hastened the fatal termination.

CASE IV.

Mr. Hutchinson, of Farringdon street, has kindly furnished me with the first case; I had an opportunity of seeing the morbid parts when exhibited at the Medical Society of London.

“W. S., aged 16, an apprentice to a hairdresser, a fine, strong, healthy-looking lad, had always enjoyed good health until about ten months ago, when he went to the Adelaide Gallery, and received three shocks from an electrifying machine. When he took hold of the brass knobs he found that he could not

let go, and afterwards complained that he had been shaken severely. On returning home, he said that he felt unwell—was sick, had no appetite, and was subject to drowsiness; he changed colour frequently, and had a blue appearance in the face, and continued so for two or three days. About ten months ago he had a severe convulsive fit whilst standing at the door of the shop: I was sent for, and immediately attended. He appeared faint; I laid him down and threw some water on his face, and he soon recovered. The following day he suffered from a severe pain in the head, when I applied a few leeches to the temples, and afterwards a small blister behind the neck; he then appeared well, and I did not see him again until Friday last, December 15th, 1843. It appears he had for some weeks past complained of languor and weakness, and occasionally of palpitation of the heart; that his legs were painful, and a little puffed; and his friends noticed that his complexion was of a leaden hue. On Thursday last his sister took him to a physician, who suspected some disease of the heart. He ordered a mixture with ant. potass. tart.; but as it produced frequent vomiting it was discontinued on the Friday, as he appeared to be getting worse. I was sent for about 8 p.m. on this day, and found him in articulo mortis; his countenance was livid; his fingers blue; pulse nearly imperceptible at the wrist; breathing frequent and laborious; and the pupils were contracted. I gave him some brandy and water, and applied a mustard poultice to the chest; but he died about half-past nine o'clock. On Monday, the 18th, I examined the body, and with the exception of the heart, the different organs of the chest and abdomen appeared healthy. There was a little serum in both the cavities of the pleura, and about an ounce in the pericardium; the heart was large, and its right side filled with coagulated blood. On opening the aorta, we perceived morbid growths attached to the semilunar valves, which on examination appeared of a calcareous nature; some of the *carneæ columnæ* were incrustated with a similar deposit. I was informed that the lad had never suffered from rheumatism, but that his father was a gouty subject."

I am inclined to think that this disease originated in the

electric shocks, which produced sudden contraction of the ventricle, and forcible reaction of the blood against the valves.

CASE V.

The second case occurred to my friend Mr. Bristowe, of Camberwell. I was present at the autopsy.

Mr. Bristowe was called to Mrs. A., aged 38, whom he found dead on his arrival. The following particulars were obtained from her friends. She had always been in a delicate state of health, was subject to palpitation of the heart, and her breathing became difficult on the slightest exertion. The day before her death she had a severe attack of purging and vomiting, supposed to have arisen from a hearty supper which she had made off cow's heel the night before. The sickness and diarrhoea continued until the evening, when she gradually sunk. She had no medical assistance.

The body thin; the skin of a yellowish hue; the brain slightly congested, but otherwise healthy. Nothing remarkable was observed about any of the thoracic or abdominal viscera, except the stomach, the mucous membrane of which was ecchymosed in several places, and its surface covered with mucus; the left ventricle of the heart was hypertrophied to a small extent; the mitral and sigmoid valves normal. For the appearance of the aorta and its valves, see Case 62, Table of Arteries.

An inquest was held, and the contents of the stomach carefully examined by a lecturer on chemistry, at one of our hospitals, and nothing deleterious was discovered. This attack of diarrhoea occurring to a person with a healthy condition of the circulatory apparatus, would probably have occasioned but temporary inconvenience.

The two next cases are good examples of the continuance of life for a considerable period, under a very contracted state of the aortic orifice. They afford an interesting contrast to the eighth case, where a very slight lesion occurring suddenly, produced death. Organic change to a great extent may exist in the semilunar valves, provided its progress be gradual. The

state of the pulse is another interesting feature in these cases ; at the commencement of the disease it was probably full and bounding, but when the mouth of the aorta became so contracted as not to admit a sufficient quantity of blood to distend the artery, it was scarcely perceptible.

CASE VI.

I am indebted to my friend Mr. B. Evans, of Trinity street, for allowing me to see the following case several times, and also for being present at the post-mortem examination.

Mr. R., aged 53, a lawyer's clerk, formerly of intemperate habits, had been under the care of Mr. Evans for eighteen months. When first seen by Mr. Evans, January 1845, he had bronchitis ; the pulse was feeble, and bellows-sound was heard over the region of the aortic valves. He recovered from this attack, and was able to attend to his usual occupations until January 1846, when he again came under Mr. Evans's care for bronchitis ; he had been subjected to great mental and bodily exertion, and was much exposed to the weather during this time ; his breathing became hurried and oppressed ; the pulse was barely perceptible at the wrists, and sometimes it could not be felt ; there was dulness on the left side of the chest, and the bellows-sound was louder than before ; palpitation of the heart had never been complained of.

May 10th, 1846. For the last two months he has been confined to the house, in consequence of difficulty of breathing, on the slightest exertion. After this time the extremities became anasarcaous ; effusion also took place into the peritoneum and left pleura, and he died on the 2d of June. The pulse, for some weeks before his death, was often not perceptible ; and when felt, a mere vibratory motion could be distinguished.

Examination, 26 hours p. m.

Chest.—The right and left pleural cavity contained about two quarts of clear serum ; the lung was compressed to the size of a large kidney, but its structure was healthy ; the left lung large and emphysematous ; no fluid in the pleura ; the

heart one third larger than natural; the left ventricle much hypertrophied; the tricuspid and mitral valves healthy; the aortic valves converted into thick bony layers, leaving only two small orifices for the passage of the blood; these were formed by the chink being united in the middle by ossific deposit; one of these openings was round, and about a line in diameter, the other was oblong, and a little larger; the pulmonary artery was considerably dilated, but otherwise normal; the liver a little fatty and mottled; kidneys congested; the remaining viscera normal; brain not examined. For the appearance of the arteries, see Table of Arteries, Case 84.

CASE VII.

My friend Mr. Martin, of Haverhill, Suffolk, has furnished me with the subjoined.

“H. P., aged 45, of fair complexion, and rather low stature, but very muscular, by trade a gardener (of temperate habits), became ill about ten years since, but not so much so as to prevent his working, except occasionally, when he complained of shortness of breath; never had œdema of the extremities, nor any other dropsical symptom. He suffered occasionally from slight cough; and about a month before his death, his breathing became extremely oppressed; pulse small, and intermitting; heart's impulse very much increased, and at times strong; sound on percussion, dull over the whole of the left side; bellows-sound louder than I ever heard it, and *frémissement cataire* generally present. While stooping to take up something from the ground he fell forward, and died instantly.”

During the last ten years, until within six months of his death, he continued at his work, and was never laid up for more than a day, and then with shortness of breathing.

Post-mortem examination.—Chest and lungs sound; great hypertrophy of the left ventricle of the heart; the ascending aorta rather dilated, and thinner than natural; the semilunar valves converted into a thick bony circle, leaving a small oblong orifice, which would scarcely admit the blade of a common sized penknife (plate IV, fig. 10; preparation 1557, College Museum).

CASE VIII.

March 24, 1841. I examined, with Mr. Lowne, of Walworth, the body of a woman, aged 28, who yesterday, whilst sitting up in her bed, suddenly expired. Unfortunately but little of the previous history of this case was known. The patient had been admitted into the Walworth poor-house thirteen weeks before her death; she was unmarried, and at the time of her admission was pregnant with her third child. She had been in Guy's Hospital for disease of the knee-joint, but was discharged in consequence of her pregnancy; she was confined on the 7th of February; the labour was natural, and she appeared to be doing well until the 23d of March, when she said that she was afraid she should lose her milk; the nurse also thought that her breathing was quicker than natural; she could lie in the recumbent position, and took her food and porter as well as usual. After her death I gathered the following additional information respecting her, from the nurse and women who were in the same ward. For six weeks prior to her confinement she was in another ward, and apparently well, with the exception of pain in the knee, which was often very acute, but was generally relieved by hot fomentations; she appeared in good health till the day before her death, when she complained as before stated, but was anxious to get up and use her crutches, which, however, she did not do. The body was inspected twenty-three hours after death.

External appearance firm and muscular.

Chest.—The pleuræ contained about six ounces of serum, and the pericardium about the same quantity; there was no deposit of lymph in the pericardium, which was apparently healthy; the heart large; the left ventricle much hypertrophied; the edges of the semilunar valves irregular; one valve much thickened, irregular, and cartilaginous; to this was attached a cylindrical fibrinous coagulum, about two inches in length, extending into the aorta; the membrane covering this valve internally was ruptured in a perpendicular direction, so as to render the valve more lax and projecting; the right semilunar valves normal; the right auricle dilated, and filled

with a white gelatinous coagulum; the lungs healthy in structure, but a large quantity of serum escaped when they were cut into.

Abdomen.—The stomach contained a large quantity of partly-digested food; the mucous lining was in several parts congested, but the redness was not florid; the remaining abdominal viscera healthy; brain not examined; the interior of the knee-joint healthy, but the external part of it much thickened, apparently from inflammation of the fibrous structure.

I believe that the sudden death in this instance was occasioned by rupture of the valve, which evidently, from the appearance of the membrane, and the adherent fibrine, had been of recent occurrence. The preparation (No. 1556), is in the College Museum, and plate IV, fig. 7, is a representation of it.

CHAPTER VI.

DISEASES OF THE PULMONARY ARTERY AND ITS VALVES.

IN structure the pulmonary artery greatly resembles that of a vein : it is thin, distensible, and loses its cylindrical form on division. This artery is probably more frequently diseased than is generally supposed. In the numerous inspections I have witnessed I scarcely recollect an instance in which this vessel has been properly examined ; and the greater number of its morbid changes have been discovered accidentally. It must, however, be admitted that its diseases are comparatively few in number, and the same reason I have given for the absence of morbid deposits in the veins will, I think, apply to this vessel. Idiopathic phlebitis is of rare occurrence, and few examples are to be met with of inflammation of the pulmonary artery, and these were none of them suspected during life. In the Museum of St. George's Hospital (F. A. 11) is a beautiful specimen of fibrinous coagula taken from the branches of the pulmonary artery. In the Museum of St. Bartholomew's Hospital (prep. 100), the right branch of the pulmonary artery is filled with a firm coagulum of fibrine, the coagulum is chiefly adherent to the sides of the vessel. Mr. Paget¹ has recorded several cases of obstruction of the pulmonary artery from fibrinous coagula ; he says, "they are not of rare occurrence, and are sometimes the sole or chief cause of death." In Guy's Hospital Museum are three specimens of the same kind (1450⁶⁰, 1450⁶², 1450⁶³). On a careful examination of the preparations last named, little doubt, I think, can arise as to the coagula being the result of inflammation. In the 60th volume of the 'Medical and Physical Journal,' two cases are related, which occurred in the practice of Dr. Elliotson, where the caliber of the pulmonary artery was much diminished. In

¹ Med.-Chirurg. Trans., vol. xxvii.

the first, the artery was contracted to the size of the brachial for some inches : in the second, the contraction was produced by a fibro-cartilaginous tumour, as large as an egg. Both patients suffered from dyspnœa and dropsy.

Dr. Crowfort¹ met with a case of ulceration of the left branch of the pulmonary artery in connexion with abscess of the lung.

Dilatation of this artery, although not often described, is probably far from unfrequent. Dr. Hope² relates an example where the artery was dilated to $4\frac{1}{2}$ inches in circumference ; and in Case 84, Table of Arteries, the circumference of the vessel had increased nearly to the same extent.

In the Museum of St. Bartholomew's Hospital (No. 90) there is a specimen of aneurism with deposit of fibrine in the left branch of the pulmonary artery. Mr. Adam, in the 2d volume of the 'Calcutta Medical Society's Transactions,' mentions a case of sudden death from the spontaneous rupture of this artery ; the vessel was also considerably dilated ; probably aneurismal.

Two cases (177, 359,) of aneurism of the branches of the pulmonary artery will be found in the Table of Aneurisms. I know of no case on record of aneurism of that artery before its division.

The various adventitious deposits so common in the aortic system are rarely found in the branches of the pulmonary artery. In the case of angina pectoris (page 76) I detected atheromatous deposit in the pulmonary artery. Preparations 1450⁶³ and 1450⁶⁹, Guy's Hospital Museum, are also examples of the atheromatous deposit : these are the only specimens I have seen. Morbid alterations of the pulmonary valves are seldom met with ; when they occur, they appear to arise generally from the extension of endocarditis of the right ventricle. Guy's Hospital Museum, 1413⁵⁵, furnishes an example of their entire destruction from this cause. Mr. Langstaff³ had in his collection (294) the orifice of the left branch of the pulmonary artery which was surrounded by bone ; and I have met with

¹ Med.-Chirurg. Trans., vol. xxvi.

² Diseases of the Heart, &c., 1831.

³ Langstaff's Catalogue, 321.

a few recorded¹ examples of thickening of these valves from inflammation.

Although I have not generally, in this treatise, alluded to anomalies of distribution or form, I think the following cases of absence of the pulmonary artery will not be considered out of place.

April 13th, 1846, I examined, with my friend Mr. B. Evans, of Trinity square, the body of a female aged 12 years. Mr. Evans had been called to her on the night of the 11th, and found her dying. The father has furnished me with the following history of the case. "When born, the medical attendant thought she could not live, but she had then no blueness of skin; she had been dumb from her birth, and always a very delicate child; had been examined by several medical men, who said that her heart was diseased; she had frequent palpitation and dyspnœa on bodily exertion, especially on ascending the stairs; and the action of the heart was sometimes discernible beneath the dress; she was also subject to cough and pain of the side; the hands, feet, lips, and face were often blue, the former generally so—the ends of the fingers were bulbous; she had before her death frequent cough, and expectoration of sero-purulent matter, but as she had often been indisposed her friends were not alarmed, and consequently did not obtain earlier assistance."

Chest.—Heart rather large, and both ventricles slightly hypertrophied, and of equal thickness; the right cavity dilated; there was an opening in the upper part of the septum of the ventricles, which would readily admit the little finger; the mitral tricuspid, and semilunar valves healthy in structure, but the last are thicker and more lax than usual; the lungs of their natural size, their substance normal, but the bronchial membrane highly injected and covered with sero-purulent fluid; all the abdominal viscera presented a natural appearance. Brain not examined.

I removed the heart from the body, dividing the aorta, about which there was nothing remarkable, close to the left sub-clavian, and did not observe that the pulmonary artery was absent until the anomaly was pointed out to me by a medical

¹ Archiv. Gén. de Méd., 1844.

friend (Dr. Norman Chevers).¹ On a careful inspection I found two small vessels which would readily admit a common-sized probe running along the anterior part of the aorta; they were about an inch in length, and terminated in two or three smaller branches. On injecting these with air and water the trunks were found to end in blind extremities in the parietes of the ventricle, at the root of the aorta, so that the blood must have regurgitated into them from a larger branch; no trace of a pulmonary artery could be found. The preparation is now in my collection.

The mother was frightened during her pregnancy, and always attributed the child's ill health to this cause.

I have seen another preparation very similar to the above, which is in the possession of Mr. Barlow, house-surgeon to the Infirmary for the Diseases of Children, in the Waterloo road.

It was taken from a boy 3 years of age, who had been blue from his birth, and who died suddenly in a violent fit of passion.

The most important alterations were, excessive cerebral congestion, and kidneys nearly as large as those of an adult.

In this heart there is not a vestige of a pulmonary artery; the aorta is common to both ventricles, and an opening exists in the upper part of the septum, which will admit the end of the little finger; the foramen ovale is partly closed by a valvular curtain; the aorta is divided near the innominata, and it is not known by what means the lungs, which were not deficient in size, were supplied with blood.

In the London Hospital Museum there is a heart without a pulmonary artery, taken from a girl 16 years of age, who had laboured under blue disease, with difficulty of breathing on the slightest exertion, from her birth. The lungs were supplied by the bronchial arteries; these arteries so large that their united area would equal the area of the pulmonary arteries.

It is probable, I think, that the lungs in the foregoing cases were supplied from the same source.

¹ For a more detailed account of these anomalies, I must refer the reader to some excellent papers by this gentleman, recently published in the 'Medical Gazette.'

In the Guy's Hospital Museum is another specimen of this kind (No. 1383²⁵), taken from an intelligent boy, about 10 years of age, who was the subject of blue disease, with great orthopnoea. When in the hospital he was thought to be suffering from plastic bronchitis.

In this preparation there is no trace of a pulmonary opening, but there is an impervious cord in the situation of the pulmonary artery; the lungs appear to have been supplied with blood by the ductus arteriosus and two of the bronchial arteries.

Mr. Prescott Hewett has shown me two preparations of this kind which are now in the St. George's Hospital Museum. The first was taken from a boy 9 years of age, who was affected with blue disease, and who died of congestion of the lungs.

The aorta arises from the left ventricle, the pulmonary opening is quite occluded, and above this is a small pulmonary artery; the two ventricles communicate with each other, the right being much the larger of the two. As in the case first mentioned, the aorta was divided close to the subclavian, and it is impossible to say how the lungs were supplied with blood.

The other heart was taken from a boy, aged 10 years, also the subject of blue disease, who died of congestion of the lungs. The aorta arises from its natural position as well as the pulmonary artery, but the latter is all but closed by a membrane stretched across its ventricular aperture (this membrane being formed by the union of the valves), except at the central part, where there is a foramen of the size of a pin's head. The auricles communicate freely; the right ventricle merely rudimentary.

Several cases of absence, contraction, and malformation of this artery are recorded by Lordat, Ramsbottom, Wilson, Meckel, Smith, Tiedemann, Gintrac, W. Hunter, Hodgson, Shearman, and others; but the subjects of them have seldom lived for so long a period as in the cases I have related, indeed the greater number of them have not attained the age of twelve months.

CHAPTER VII.

ABDOMINAL PULSATION.

ALTHOUGH inordinate pulsation of the aorta has been described by some authors, as one of the symptoms of inflammation of that vessel, we have abundant evidence to show that it may arise from other causes; and as this condition of the abdominal aorta has been frequently mistaken for aneurism, I am desirous of devoting a few pages to its consideration.

Dr. Baillie¹ was the first to direct the attention of the profession in this country to epigastric pulsation; and he relates a case of twenty-five years' standing, which was mistaken by Sir Cæsar Hawkins and Mr. Bloomfield for aneurism. Laennec and others have recorded similar instances; and in the first case hereafter mentioned, my patient was seen by several practitioners, who believed her to be affected with aneurism.

These cases, I think, may be conveniently divided into three kinds. First, those depending upon constitutional causes, such as chlorosis, hysteria, anæmia, from loss of blood, &c.; in short, any state of system inducing an impoverished condition of the circulating fluid, or derangement of the nervous functions. A very instructive example of the occurrence of this affection from loss of blood is related in a late number of the 'Lancet,' 1845, by Mr. Bonnar. "A young man, aged 22, was bled largely and repeatedly (15lbs. in nine days), for supposed cramp in the stomach; this was followed by pulsation in the abdominal aorta, of so violent a character as to shake the bed on which he lay, and cause a heaving of the bed-clothes; the palpitation extended from about an inch above the umbilicus, to three inches below, and about an inch to the left of the mesial line above, and two inches where it terminated below; it was sometimes stronger

¹ Transactions of the College of Physicians, vol. iv.

than at other times, and increased on motion." The case was considered by his first medical attendant to be aneurism of the abdominal aorta, and Valsalva's treatment was pursued with aggravation of the symptoms; he was then put upon a more generous diet; preparations of iron and light bitters were exhibited, and his health speedily improved. In this case no abnormal sound was present.

In the second variety, mechanical obstruction appears to be the chief cause of the pulsation. The third case is a good example of this. The most frequent of the mechanical causes, are tumours of various kinds pressing upon the vessel; such as enlarged pancreas or spleen, scirrhus stomach, diseased mesenteric glands, and collections of air and scybalous matter in the bowels. Allan Burns,¹ in addition to the foregoing, mentions solidification of the lower lobes of the lungs, dilated heart, and enlarged vena cava.

In the last, and I believe the most frequent form, the aorta appears to be sympathetically affected. Dr. Baillie² supposed that it depended on a disordered state of the digestive organs, and that it occurred more frequently in the male sex. This latter opinion I believe to be erroneous, as I find, in the greater number of recorded cases, that females have been the subjects of it.

Dr. Fausset³ supposes (although he adduces no pathological evidence) that it generally depends upon chronic inflammation of the stomach; and the first two cases I have related fully bear out the correctness of his opinion.

Dr. Stokes⁴ says, "we may have from enteritis and peritonitis a throbbing of the abdominal aorta, or its vessels perfectly analogous to the morbid action of the radial artery in whitlow, or of the carotid or temporal arteries in cerebritis;" he has seen it frequently in gastro-enteritic fevers, and he further adds, "it may also be present in corrosive poisoning, even when the pulse at the wrist is scarcely perceptible."

Although I am disposed to agree with these authorities, that stomach or intestinal affection is generally the exciting cause of this malady, I believe that it can only take place when the

¹ On Diseases of the Heart.

² Before cited.

³ Dublin Journal, vol. xi.

⁴ Ibid.

parietes of the vessel are in a weakened condition : this probably depending upon structural defect, or the derangement of nervous influence. It is difficult to imagine that local pulsation can arise from nervous excitability alone, or that the upper part of the aorta can be morbidly excited without the lower portion being in a similar state ; if, however, the coats of the artery, from want of innervation or structural peculiarity, lose their tone, and possess greater tenuity and extensibility in certain parts, the phenomenon is more readily explained. If functional disorder, or structural lesion of the stomach alone, would produce inordinate pulsation in a *healthy* artery, these cases, instead of being rare, would be of daily occurrence.

In the first case I have related, the aortic tunics were free from disease, but they appeared thin and yielding ; and although no evidence of dilatation existed after death, it is not, I think improbable, that it might have occurred during the systole of the ventricle.

Diagnosis.—Where the large arteries generally are the subjects of inordinate pulsation, as in the first class of cases, although bellows-sound may be present either in one artery or several, the diagnosis is less difficult than in those instances where the vessel is mechanically or sympathetically affected. Where the pulsation is limited to a small portion of the arterial tube, the diagnosis becomes more difficult, and the disorder is more likely to be considered aneurismal ; but a careful investigation of the symptoms will, in most cases, lead to the formation of a correct opinion.

In the examples I have seen, the arterial throbbing has been of a more bounding character, and the caliber of the artery could nearly be determined by the touch ; the vessel was also movable, but no abnormal sound was present.

Aneurism is often preceded by some injury to the abdomen, and is mostly accompanied by pains of an aching or tearing character ; a bruit is usually heard, and the tumour, if large, can generally be felt externally. The sex and previous history of the patient, will also afford us great assistance in determining the nature of the affection : thus, if the patient be a female, the chances will be much against the existence of aneurism.

In the table of 59 cases of aneurism of the abdominal aorta, only eight females were affected.

Treatment.—In the constitutional form, where the blood is deficient in fibrine, and the heart and arterial tunics partake of the want of tone which pervades the whole system, our object must be to improve the general health, by a course of tonic and alterative medicines; the preparations of iron, combined with occasional warm, aloetic purgatives, will probably be found the most serviceable; change of air, sea bathing, and horse exercise may also be found valuable adjuvants. If the patient be a female, especial attention must be paid to the uterine functions. If arising from mechanical obstruction, the cause if possible should be removed. Placing the patient on a low diet for a short time, and thoroughly emptying the bowels with gentle aperients, combined with purgative enemata, will greatly facilitate the diagnosis. A woman was admitted into the Middlesex Hospital, under Dr. Watson's¹ care, who had a pulsating tumour at the pit of the stomach; this was entirely removed by acting freely upon the bowels with castor oil and gruel enemata. If the bowels became constipated, the tumour reappeared.

When there is reason to suspect chronic inflammation of the mucous lining of the stomach or duodenum, the plan recommended by Dr. Faussett,² viz. spare diet, local bleeding, and counter-irritation over the region of the stomach, with small doses of blue pill and James's powder, until the gums are slightly affected, will probably be found the most successful. Dr. Faussett records several favorable examples where this treatment was pursued.

Dr. Baillie³ says, "When this pulsation has once taken place, it seldom subsides entirely, although it will vary in degree at different times." This opinion, I am disposed to think is correct, *where the pulsatory movement is confined to a limited portion of the vessel.* The throbbing may cease for a time, but will always be liable to return on the renewal of the exciting cause.

¹ Lancet, 1833.

² Before cited.

³ Before cited.

CASE I.

March, 1837. Mrs. T., a delicate woman, aged 60, whom I had attended for some years, for seven or eight weeks before her death, was subject to violent palpitations in the epigastric region; the pulsations were extremely violent and synchronous with the contraction of the ventricle; the increased impulse, however, appeared to be *confined to the upper part of the abdominal aorta*; no abnormal sound was heard, and the carotid and femoral arteries did not beat inordinately; the pulsation of the right radial was very feeble, that of the left, rather full. The symptoms were chiefly referable to the stomach, viz. tenderness over the epigastric region, acidity, flatulence, nausea, dysphagia, sickness after taking food, and giddiness in the erect posture. The treatment was directed principally to the digestive organs, and counter-irritation was used over the region of the stomach.

I examined the body 18 hours p. m.

The lungs and heart healthy: after a very careful inspection of the aorta, no disease could be discovered; the coats were rather thinner than natural; the mucous membrane of the stomach throughout presented a red, ecchymosed appearance, the effect of chronic inflammation, and was abraded to a small extent in two places; other parts normal; the right radial artery smaller than the left.

CASE II.

June 7th, 1845, I had an opportunity of seeing the following case, with my friend Mr. V. Edwards, house-surgeon to the Tower Hamlets Dispensary.

Mrs. N., aged 28, married, but without children, has been a patient of Dr. Munk's, at the Tower Hamlets Dispensary, for the last four or five months. She says that "she was in a tolerable state of health until about two years since, when she had a severe attack of sea sickness, which lasted for about twenty-four days;" after this she felt pain in the region of

the stomach, with occasional sickness ; this was followed by a strong pulsatory movement in the epigastric region. She has been accustomed to carry heavy bundles of leather, and has been subject to great mental anxiety, in consequence of domestic discomfort.

The symptoms are now as follow. Countenance rather anxious ; slight emaciation ; pulse 80, soft and compressible ; she complains of frequent pain in the epigastric region, with vomiting of green bilious matter ; a throbbing sensation at the pit of the stomach ; constipated bowels ; the menses have not appeared for ten months. On placing the hand over the upper part of the abdominal aorta, a strong pulsatory movement is felt ; it appears impossible to compress the vessel ; the artery, or the parts around seem to be thickened, but there is no circumscribed tumour, nor is any abnormal sound heard on placing the stethoscope over the artery, unless considerable pressure be used, when a slight bellows-sound is audible ; sounds of the heart normal, and its impulse not greater than usual ; the increased pulsation is confined to the epigastric region.

December 12th, 1845. Mr. Edwards has kindly furnished me with the subsequent history of the patient.

“ In the middle of July she was suddenly seized with severe pain in the right side ; this was immediately followed by the vomiting of large quantities of clotted blood, emitting a most offensive odour, resembling during the latter period of the attack, portions of placenta in an advanced state of decomposition ; the pain and vomiting continued at intervals for three days, when they both gradually subsided ; partial syncope occurred during the early period of the vomiting, but all the abdominal uneasiness previously complained of was entirely removed ; the catamenia returned in three weeks, and continued at regular intervals to the time of death. The amount of blood discharged was at least five quarts, part of which escaped per vaginam. During the paroxysms of pain and vomiting, there was prolapsus ani to a distressing extent ; and on the second day a worm several inches in length was voided alive ; the bilious vomiting returned some days before death.

The poor woman became insane, and was admitted into the Grove Hall Asylum, Stratford. Mr. Palmer, the resident

surgeon, has favoured me with the subjoined particulars of the post-mortem examination.

Chest.—Lungs healthy; pleura adherent by loose bands; heart healthy; pericardium contained an ounce of fluid.

Abdomen.—Stomach small and contracted; lining membrane erythematous, and covered copiously with mucus; abdominal aorta presented externally, nothing unusual in its appearance; liver healthy; gall-bladder full; intestines generally, normal. There was a remarkable displacement of the colon. At the upper part of the ascending portion of the gut, where the transverse arch should commence, it was doubled upon itself, and again descended into the right iliac region, from whence the transverse portion proceeded to the left iliac region; it then mounted to the left hypochondrium, was again doubled on itself, and formed the descending portion; kidneys, uterus and its appendages all healthy; brain unfortunately not examined.

CASE III.

My friend Mr. Statham, of the Wandsworth Road, gave me an opportunity of seeing the following case, and has kindly furnished me with the undermentioned particulars of the commencement of it.

“Mr. W., a hatter, aged 42. In the earlier part of his life he had been in the habit of pressing hard upon the region of the stomach. For several years past he has been assisting his father, who keeps an inn; his habits intemperate. He applied to me at the commencement of March in the present year (1845), when he complained of uneasiness in the epigastrium, anorexia, constipated bowels, dry cough, lassitude, and loss of flesh and strength. About a month after he came under my treatment, he was suddenly seized (after having eaten more heartily than usual) with syncope, followed by extreme prostration. He was conveyed to bed, and had every appearance of approaching death; the syncope frequently recurring, attended with slight convulsions. It was then for the first time discovered, that he was passing evacuations having the character of decomposed blood. He was seen by

Dr. Silvester, who was of opinion that the liver was diseased; there was tenderness (on pressure) in the epigastrium, and in the right hypochondrium, with some degree of dulness on percussion in the former situation, but no perceptible enlargement of the liver. The treatment had recourse to, was small doses of sulphate of magnesia and tincture of henbane, in camphor mixture, and occasional doses of blue pill, with wine and beef tea. For a few days he rallied, and the evacuations lost their melanotic character, but after this time, they varied much in appearance, exhibiting generally a deficiency of bile, and occasionally scum on the surface, which reflected various rays of light, and was very similar in appearance to that seen on the refuse water in gas manufactories. On a few occasions the evacuations were of a bright orange colour. He was put under a course of tonics and sent into the country; but he continued to lose flesh and strength, was ghastly pale, and had little or no appetite. At the end of July he returned home, having had another attack of melæna, accompanied by the same prostration as before, which confined him to his bed, from which he did not again rise."

September 14th. The symptoms now are great emaciation; bowels irregular, generally relaxed; the motions sometimes bilious, and at others of a dark melanotic hue; he complains of great uneasiness in the region of the stomach, with frequent inordinate pulsation of the abdominal aorta: this vessel is now pulsating with great force in the epigastrium; the pulsation is continued down to the iliac and femoral arteries, but appears to diminish much in power; the sounds of the heart are normal, and its impulse not greater than natural; pulse at the wrist feeble (98); the pulsation of the carotids rather more feeble than usual.

September 28th. I again saw him, and examined the abdominal aorta with great care; on applying the ear, no double shock or bellows-sound was heard, but the impulse of the artery was very powerful; the *femoral* arteries not beating more forcibly than natural.

He died October 7th. I assisted Mr. Statham in the examination of the body, twenty-four hours after death.

Great emaciation; heart normal; lungs healthy in structure, but the lower and posterior part of the right, infiltrated with

serum ; the larger arteries of the chest and abdomen did not present a vestige of disease. On opening the abdomen, the liver was seen studded with numerous white tubercles, varying in size from a nut to a hen's egg ; some of these were rather hard, and of a brainular appearance, but the greater number were soft, the matter resembling lard ;¹ the softening appeared to commence in the centre of the tumour ; the posterior part of the right lobe of the liver much larger than natural ; the gall-bladder was full of dark bile ; its lining membrane very dark, rough, and much softened ; the spleen normal, but between this organ and the cardiac end of the stomach was a tumour like those before described, as large as a pigeon's egg ; on removing the abdominal viscera, the aorta was seen diverging slightly to the right, and passing under another of these tumours, which was about the size of a small hen's egg (lardaceous in the centre, but harder towards the sides), and was situated about half an inch below the cæliac axis ; the aorta at this part was of its natural caliber, and quite healthy ; the lining membrane of the stomach ecchymosed in several places, its contents had a feculent smell ; the small intestines normal ; the lining membrane of the colon more congested than natural ; kidneys rather vascular, but otherwise healthy.

The subjoined case in which the circumscribed bellows-sound was present, with slight and inordinate pulsation, is a very instructive one. I am inclined to think, that the caliber of the aorta, or cæliac artery, was altered from some mechanical cause, but I am at a loss to account for the nature of this cause. Dr. Corrigan² attaches much importance to the disappearance of the bellows-sound in the erect position, as a diagnostic mark of abdominal aneurism. He observes "there are cases of bruit de soufflet in the abdominal aorta, in which the sound arises from nervous irritation or other causes, and which sometimes simulate aneurism ; but in all such cases which have come under my own observation, it could be perceived that the bruit de soufflet extended along a considerable portion of the aorta, and in most of the cases the vessel could be traced of its natural size." Dr. Corrigan ascribes the absence

¹ This probably weighed two pounds.

² Med. Gazette, vol. xx.

of bellows-sound to the hydrostatic pressure in the erect position, keeping the sides of the sac tense, and thereby preventing vibration and permanent bellows-sound. In this instance, the sound was very loud in the recumbent posture, but immediately became inaudible when the patient stood erect. The existence of aneurism, although at one time suspected, is now very improbable.

CASE IV.

September 11th, 1845. I was applied to by Mr. S., Camberwell, aged 31. Until within the last few days, he has generally enjoyed good health; he now appears to be labouring under simple continued fever. At the back of his house is a wide ditch of stagnant water, the effluvium from which is occasionally very offensive.

Sept. 25th. The usual symptoms of simple fever have existed from the time I first saw him, but I have not been able to detect any local affection, with the exception of occasional pain in the back; for several days the treatment was antiphlogistic, I then gave quinine, but without any apparent benefit; for a day or two he would sometimes appear better, and then again relapse into the same state; the pulse was quick, especially under mental excitement; skin dry; tongue generally moist at the tip, with a dark ink-stain looking centre. Yesterday he first complained of pain and tenderness in the region of the gall-bladder, extending to the back; six leeches were applied to the painful part, followed by a blister, with an opiate at night.

Sept. 26th. Pain and tenderness relieved, and he is altogether much better.

October 10th. The symptoms have not improved since the last report; the pain very severe at intervals; the tongue sometimes nearly clean, and then again assuming the inky hue before described; he is much emaciated, and considerably reduced in power. The application of leeches and a blister (which is now kept open with savin ointment), have been again resorted to; opiates have been given occasionally, and fearing that some structural change was going on in the region

of the liver, I put him on a mild mercurial course, and the gums are now slightly affected; no abnormal sound can be detected in the heart or lungs. I begin to attribute his continued indisposition to malarious influence.

Oct. 11th. As the case has not proceeded in so satisfactory a manner as I expected, I requested Dr. Barlow to see him. On placing his stethoscope over the epigastric region, Dr. Barlow discovered a distinct bellows-sound; it appeared to be near the celiac axis, was very circumscribed, and could only be heard for a short distance along the course of the vessel; it was very indistinctly perceptible in the back, and attended with a slight pulsatory movement. Dr. Barlow's prognosis was very unfavorable; he thought that he either laboured under aneurism of the aorta, or that he had some scrofulous disease of the mesenteric glands; he suggested the following:—

R. Potas. iodid., gr. vj; Potas. bicarb., 3ss; Ext. tarax., gr. xj; Sacchar, 3ss;
Tinct. aurant., 3ss; Aquæ, 3vss. M. Ft. mist. cujus capiat $\frac{1}{4}$ sextis horis.
R. Hydrarg. c. cretâ, gr. ij; Sodæ sesquicarb., gr. ij; Extr. papav., gr. iv.
M. Ft. pilulæ duæ horâ somni sumendæ.

Oct. 22d. The above medicines have been continued up to the present time with no apparent benefit. I have now ordered him a light tonic, and a mild mercurial at bed time, with a more generous diet.

November 7th. A slight amendment is observable; he is able to leave his bed, his strength and appetite are both improved, and he is free from pain. I have repeatedly examined the epigastric region with a stethoscope, and the bellows-sound until the last two or three days has been quite as loud; *in the erect position this sound is not heard.*

Nov. 30th. Bellows-sound very indistinct, and the health greatly improved. I have recommended his leaving London for the country immediately.

March 28th, 1846. He appears to be in good health; no abnormal sound is heard in the epigastric region.

October 10th. His health is perfectly good.

CASE V.

Sometimes all the arteries of the body are affected with irregular, and inordinate action; the following case, which came under my care in February, 1844, and which was also seen by Dr. Risdon Bennett, is an interesting example. A young married woman, four months pregnant, was suddenly attacked with paralysis of the left side, having had no previous symptoms to indicate brain affection, excepting slight occasional pains on the right side of the head; she died in six weeks. There was no evidence of pressure on the brain at any time, and the intellect remained unimpaired. The most remarkable symptom was the irregular and excessive pulsation of the heart and arteries; the femorals and carotids beating with so much force that their action was visible many yards from the bed; the artery was easily compressed, although apparently much distended. This inordinate action continued during her illness, the pulsation being more violent at intervals; the sounds of the heart natural but loud.

On a careful inspection of the body I found the heart rather large and flabby; the left ventricle considerably dilated; the valves, as well as every other part, normal; in the right hemisphere of the brain, a little below, and posterior to the thalamus, was a soft creamy mass about the size of a pigeon's egg; this was surrounded by what appeared to be healthy brain.

Lungs, liver, and other viscera normal.

I confess I am somewhat at a loss to account for the violent throbbing of the arteries in this case. I have frequently witnessed the arterial excitement which follows profuse hemorrhage, but never met with the same amount of pulsation as in this instance. The patient had been chlorotic a few months before, but the menses were soon restored after the administration of steel medicine, and she became pregnant; she called at my house the day before the attack of paralysis, when I observed nothing remarkable about the circulation, and she was certainly not in an anæmic condition. Soon after the occurrence of the fit I took 10 oz. of blood from the arm, and twelve leeches

were applied to the temples with apparent relief. The loss of blood, the condition of the uterus, the flabby heart, with the left ventricle dilated, and the ramollissement of the brain are all points of great interest, but they do not, I think, satisfactorily account for the phenomenon.

Is it not probable that the vis a tergo was so diminished by the dilated and flabby condition of the left ventricle, as to keep the large arteries in a state of preternatural distension, the heart's action being insufficient to propel the blood with its usual freedom through the smaller vessels? Did regurgitation take place through the mitral valve? or did the brainular lesion so impair the functions of the ganglionic nerves as to produce the pulsation in question? These are matters which I will leave the reader to determine.

CHAPTER VIII.

ANEURISM.

ANEURISM is one of the most important diseases affecting the arterial system. It is said to consist in the partial dilatation of all the coats of the artery, or in the rupture of the internal coats ; the cellular tunic forming the aneurismal sac. The history of this disease is so well known to every intelligent practitioner, that I think its recapitulation on the present occasion is needless.

Aneurism is usually divided into the spontaneous and traumatic, and the terms true, false, mixed, varicose, aneurismal varix, aneurism by anastomosis, diffused and circumscribed, are used to designate the varieties of this disease. Another species of aneurism, termed dissecting, has been described of late years. It consists in the rupture of the inner and fibrous tunics, the blood finding its way between the layers of the latter coat, or between it and the cellular. It is questionable whether this lesion should be included under the head of aneurism ; but as the term is now generally admitted, I shall continue to employ it. A curious variety of aneurism is also sometimes met with where the cellular coat gives way, and the sac is formed by the projection of the internal and middle coats : there is a beautiful specimen of this in the College Museum, from Mr. Liston's collection (No. 1642). Laennec, Dubois, and Dupuytren have met with similar examples, but they are very rare.

Although the present nomenclature is in many respects very faulty, I am at a loss to substitute one which would be free from objection. Scarpa believed that aneurism could not take

place without the rupture of the internal coats, and hence the term true, he thought incorrect. I think there can be no doubt that Scarpa's opinion was erroneous, as some specimens of true aneurism can be found; it is, however, probable that this form of aneurism is much less frequent than many modern writers suppose. It is extremely difficult, when the sac has attained a large size, to ascertain the exact condition of the coats; and in many small aneurisms, in which the inner tunics were considered entire, I have, on a careful examination, found them imperfect. Preparations 1676 and 1677, in the College Museum, appear to me to be a good example of this. The sac, in many cases, is lined with a delicate fibrinous layer, which may easily be mistaken for the serous membrane. Another, and I believe very common lesion, in small circumscribed aneurism, is a defective condition of the fibrous coat, arising from rupture, or separation of the transverse bands. Case 69, in the Table of Arteries, is probably an instance of this kind; and I believe that I have seen several of a like description. In these specimens the internal and cellular tunics are perfect, and they have, therefore, been considered as true aneurisms. It is very probable that in the majority of what are called true aneurisms, especially when small and circumscribed, that the fibrous tunic is the part first affected. I am aware that in this opinion I differ from preceding writers, but I am convinced that a rigid investigation of morbid specimens will prove its correctness.

The term spontaneous is highly objectionable, as I believe that the greater number of aneurisms, whether seated in the cavities or limbs, are produced by external injury, or great mental or bodily excitement.

A more simple classification than the foregoing would be very desirable. M. Lisfranc suggests that spontaneous and traumatic are the only terms necessary. Mr. Luke, in the 'Medical Gazette,' 1845, recommends the following division:—
“1, Saccated, including the traumatic; 2, Tubular; 3, Dissecting; 4, Varicose; 5, Capillary.”

If the term endogenous were substituted for that of spontaneous, when speaking of aneurisms which arise from lesions

of the inner coats; and the term exogenous or traumatic applied to those which are produced by external division of the arterial walls, I think the nomenclature would be more appropriate. The various names before alluded to might still be retained, to distinguish the varieties of aneurism. To prevent confusion I shall, however, continue to employ the terms now in use.

An aneurism then may be defined, as a pulsating and elastic tumour, containing fluid or coagulated blood, arising from a simple dilatation of the whole, or a part of the arterial parietes. The form of the sac may be globular, oblong, fusiform, tubular, pyramidal, peduncular, irregular, bisacular, in short, it may assume any variety of shape; this depending in a great measure upon the caliber of the vessel, and the support or resistance afforded by the surrounding parts.

The comparative frequency of aneurism in different arteries, has been variously estimated by those who have written on the subject. Mr. Hodgson's¹ Table of 63 Cases comprises the following:—Ascending aorta, arch, and innominate, 21 cases; Descending aorta, 8; carotid artery, 2; subclavian and axillary, 5; inguinal, 12; femoral and popliteal, 15.

Mr. Lawrence² says, "it is most frequent in the aorta and innominate; next in the external iliac, femoral, brachial, and carotids; while in the arteries of the third and fourth order, such as the radial and the ulnar, the anterior and posterior tibial, and the interosseal, it is extremely rare, hardly ever seen there, except in consequence of a wound or some external cause. It is much more frequent in arteries of the lower, than in those of the upper extremities; indeed, it has been stated by some, that hardly an instance can be produced of any aneurism below the axilla, which cannot be referred to a wound, or some obvious external cause."

Dr. Chelius³ observes, "aneurism may occur in all arteries;

¹ Before cited.

² Lectures, *Lancet and Medical Gazette*.

³ South's translation.

the internal arteries are, however, more frequently attacked with it than the external, the reason of which may be that the nearer the arteries are to the heart, the thinner are their walls in proportion to their diameter, consequently they are less capable of withstanding a violent pressure of the blood. The curves also which the arteries describe in their course, have an influence on the more frequent origin of aneurism. Aneurism of the arch of the aorta is most frequent; next comes aneurism of the popliteal, then of the inguinal, axillary, and carotid arteries."

Dr. Baillie¹ says, the most frequent situation of thoracic aneurism, is at the arch of the aorta.

In Hooper's 'Medical Dictionary,' 1839, it is stated that "true aneurism is most frequently met with in the aorta, particularly at its arch; its next most common situation is the popliteal artery; it is also familiar to surgeons as occurring in the external iliac, femoral, common carotid and subclavian arteries; it is rare in the brachial artery, and scarcely ever occurs in any small artery wherever situated."

M. Lisfranc² gives a table of 179 spontaneous aneurisms, not including the aortic. The cases are selected from foreign works, as well as from those of his own country. They consist of 59 popliteal, 26 of the femoral at the groin, and 18 at other points; 17 carotid, 16 subclavian, 14 axillary, 5 external iliac, 4 brachio-cephalic, 3 brachial, 3 common iliac, 3 anterior tibial, 2 gluteal, 2 internal iliac, 2 temporal, 1 internal carotid, 1 ulnar, 1 peroneal, 1 radial, 1 palmar arch.

Mr. B. Phillips's Table of 195 Cases of external aneurism, 'Medical Gazette,' 1840, does not differ materially from the foregoing.

M. Chomel, in the 'Dictionnaire de Médecine' observes, that

¹ Morbid Anatomy.

² Des diverses méthodes et des différens procédés pour l'oblitération des Artères. 1834.

“aneurisms have been most frequent in the large arteries, and in those nearest the heart. The external iliac, femoral, popliteal, subclavian, and axillary are the oftenest affected.”

Mr. Wardrop, in the ‘Cyclopædia of Practical Surgery,’ 1841, page 211, says, “the arterial trunks of the first magnitude become aneurismal much more frequently than those of inferior caliber, and hence internal are much more frequent than external aneurisms. Aneurisms are most frequently formed at the curvature of these arteries, and where they divide into branches. The aorta, particularly at its arch, is more frequently affected with aneurism than any of its branches; and this observation accords with the theory that the lateral impulsion of the blood concurs in the production of aneurism, when the structure of the artery has undergone a change: the curves formed by the arteries being precisely the points where this impulsion is greatest, and where aneurism occurs most commonly. The innominate, subclavian, carotid, axillary, iliac and femoral arteries are subject to aneurism next in frequency, whilst the temporal and occipital arteries, those of the leg, foot, and fore-arm, and the arteries within the cranium, are rarely found to be aneurismal.”

SUMMARY.

The following is the summary of the 551 Cases in the Table of Aneurisms.

<i>Situation.</i>	<i>No. of cases.</i>	<i>Age.</i>	<i>No. of cases.</i>
Thoracic aorta	175	Under 10 years of age	1
Pulmonary	2	Between 10 and 20	5
Abdominal aorta and its branches	59	“ 20 “ 30	71
Common iliac	2	“ 30 “ 40	198
External iliac	9	“ 40 “ 50	129
Gluteal	2	“ 50 “ 60	65
Femoral	66	“ 60 “ 70	25
Popliteal	137	“ 70 “ 80	8
Posterior tibial	2	“ 80 “ 90	2
Innominate	20	“ 90 “ 100	1
Carotid	25	Age not stated	46
Cerebral	7		—
Temporal	1		Total 551
Ophthalmic	1		—
Subclavian	23		
Axillary	18		
Subscapular	1		
Brachial	1		
	—		
Total	551		
	—		

I have examined 364 preparations of Aneurism in the London Museums, and the numbers are as follow:—

<i>Situation.</i>	<i>No. of cases.</i>	<i>Situation.</i>	<i>No. of cases.</i>
Thoracic aorta	207	Subclavian	12
Abdominal aorta	42	Axillary	8
Internal iliac	1	Carotid	9
Common iliac	2	Mesenteric	2
External iliac	7	Splenic	2
Femoral	12	Cerebral	1
Popliteal	50	Vertebral	1
Posterior tibial	2	Radial	1
Innominate	3	Pulmonary	2

No useful deduction can be drawn from the above as to the comparative frequency of aneurism, as the greater number of external aneurisms are cured by operation.

Causes.—It will naturally be asked, why aneurism is more frequent in one artery than in another? but, if we take into account the form, size, and anatomical bearings of the different arteries, the matter I think admits of a ready explanation. Thus, the anterior and right side of the ascending aorta is the most common seat, and here the impulse of the blood is the strongest; especially during sudden and violent contractions of the ventricle. Next in order as to frequency, comes the arch of the aorta, a part also subject to the blood's impulse, and probably somewhat weakened by the giving off of the large branches: the disease does not so often occur in the descending thoracic; and when it does, it is generally immediately below the arch where the parietes of the vessel are more acted upon by the current of the blood, than in the straight portion. In the abdominal aorta, the most common situation is near the celiac axis, where several large branches are given off, and below which part the aorta diminishes in size. The common iliac, which is straight, and gives off no branches, is rarely affected; and the same remark applies to the external and internal iliac; the branches from the former are very small, and the latter vessel is short, and terminates in numerous divisions. The upper portion of the femoral artery is often affected with aneurism. The branches arising from it, the frequent motion of the thigh, and the greater liability of the vessel in this situation to external violence, are probably the chief causes. The middle third of the femoral is seldom subject to this disease; whilst the popliteal which forms a curve over the joint, gives off several articular branches, is much exposed to violence, and probably to elongation in sudden extension of the leg, is very frequently aneurismal. The disease appears to occur in the branches of the arch in nearly similar proportions; but those on the right side are rather more subject to it. It is difficult to assign a reason for the exemption of the brachial artery from this lesion. The most likely is the looseness of its connexions and the curvature of the axillary artery, which allows of a certain amount of elongation, and thereby prevents the stretching which probably occurs under certain circumstances in the popliteal.

In reviewing the foregoing localities of aneurism, this in-

quiry naturally presents itself, viz :—Are the arteries in these situations more subject to disease? After a very careful investigation, I have come to the conclusion, that the various deposits are less frequent in the arteries most affected with aneurism : for example, the ascending aorta, and popliteal arteries (the most common seats of aneurism) are not oftener diseased than the descending thoracic, the lower part of the abdominal aorta and the iliacs, where the disease is comparatively rare. I must, therefore, infer that these deposits are less concerned in the production of aneurism than is generally supposed ; and that mechanical causes afford a more probable explanation.

*Sex.*¹—Including all the cases (551) the proportion of females is rather less than one eighth. In the 243 aneurisms of the aorta, pulmonary and cerebral arteries, it amounts to about a fifth. In the 25 carotid aneurisms, there are 13 males to 12 females. In the 308 cases of external aneurism, including the carotid, there are 276 males to 32 females, the latter forming barely a tenth ; whereas, in the 21 examples of dissecting aneurism, the females amount to 14, the males to 7.

It is difficult to explain why men should be so much more frequently the subjects of aneurism than women, the structure of the arteries being nearly the same in both sexes, although in the latter the coats are not quite so thick and unyielding as in the former ; but I believe that the principal reason will be found in the nature of their occupations, those of males being much more violent and laborious. This opinion is strengthened by the fact, that in females, who have their necks exposed, and who are consequently more subjected to violence, carotid aneurism is nearly as frequent as in males.

Age.—It will be seen by the table that aneurism most frequently occurs in persons from thirty to forty years of age,

¹ There appears to be some resemblance between the comparative frequency of hernia and aneurism in the two sexes ; thus in hernia the proportion is about four or five males to one female. The anatomical difference will account in some measure for the greater prevalence of the disease in the male, but it is certain that laborious occupations tend much to produce the complaint.

when the coats of the arteries have generally undergone some change of structure, and when the most violent exertions are used; after sixty the disease is comparatively rare.

The most frequent of the predisposing causes of aneurism is supposed to be a diseased condition of the arterial tunics, consisting of the various deposits in the subserous membrane, producing a lacerable state of the inner coats. The coats of the vessel may also be weakened and dilated by continued violent muscular efforts, as well as by the increased impulse of the heart. I believe that aneurism may result from violence to an artery perfectly free from disease. I have met with several recorded examples in strong, healthy young men, under twenty-five years of age, who, when making violent muscular efforts, or subjected to external injury, have felt the artery suddenly snap, and this sensation has soon been followed by the appearance of the tumour. In the examination too of numerous preparations of aneurisms of the extremities, I have found the arteries, up to the seat of dilatation, free from disease. Amussat, Jones, and others, have endeavoured to produce aneurism in the lower animals, by lacerating the internal and fibrous coats of the artery; but the attempts were all unsuccessful. No useful inference can be deduced from these experiments; the structure of their arteries, as well as their pathological changes, differing so much from those of man.

Mercury.—Mercury has been considered by many writers to exert a great influence in producing this disease. I have not been able to meet with sufficient evidence to lead me to such a conclusion. Mr. Porter says, "Few old persons are subjected to a course of mercury that do not perish shortly after by the bursting of a blood-vessel." I have met with many examples to the contrary. I have, moreover, examined the large arteries of the chest and abdomen of many persons who had been subjected to long courses of mercury, and I have not found the vessels more diseased than usual. Amongst the workers in quicksilver on glass, and button gilders, no mention is made of the frequency of arterial disease; mercurial trembling and palsy being the chief maladies. Syphilis, venereal excesses, the use of spirituous drinks, and any causes,

mental or physical, producing violent and irregular action of the heart and arteries, must predispose to this affection. The most common of the exciting causes, both in internal and external aneurism, is, I believe, violence and sudden muscular effort. The Table affords numerous examples of this, and in nearly all the patients affected with this disease that I have examined, I have been able to trace it to these causes.

Laborious occupations.—Mr. Porter,¹ a high authority on this subject, believes that great bodily exertion does not predispose to this disease; and in his late work on Aneurism, page 38, he says, “I cannot believe that any degree of labour, or exertion, or exposure, predisposes to the occurrence of aneurism: first, because the most laborious people in society, sailors, blacksmiths, porters, &c., are not a whit more liable to the disease than any other classes in the community; secondly, because women in the lower ranks of life are, in many instances, obliged to undergo more labour, in proportion to their strength, than men and boys, and children infinitely more so; yet we have seen the exemption that these classes enjoy; and, thirdly, aneurism is not more prevalent among the poor and laborious, than among the rich and idle, in proportion to the relative numbers of these classes respectively. This latter assertion is so opposite to the generally received opinion, that many will be inclined to disbelieve it; and its truth cannot be proved for want of statistic reports. I have made it, however, from my own observation, and I would appeal to any practical surgeon of experience for its corroboration. Again, it has been stated, that particular trades and callings, chiefly such as oblige their followers to keep their limbs in a bent posture, predispose to aneurism, and this is explained by the idea of the blood being forcibly impelled against the side of the vessel in consequence of such position. Hence the prevalence of the disease amongst coachmen, postilions, horse soldiers, &c. But there can be no doubt that other persons are equally, if not more exposed to such influences, in whom the disease does not prevail—studious persons, and the higher order of females for

instance ; but, with reference to trades, we may recollect, that tailors spend most of their time in a very contracted position, and yet no one ever considered them as peculiarly predisposed to aneurism. I cannot, therefore, admit any of these as creating a predisposition to the disease."

It is with reluctance I am obliged to differ from a gentleman of such deservedly high repute as Mr. Porter ; but the large amount of evidence which I possess, leads me to a very opposite conclusion.

Climate.—Aneurism is, I believe, more frequent in England than in any other country. Temperature has probably but little influence in the production of the disease ; but when the habits of the people are considered, their great industry, the violent and continued exertions they are accustomed to use, as well as their greater addiction to the use of ardent spirits, the cause admits of a ready explanation. Sailors and soldiers, especially the former, are more liable to aneurism than any other class ; and they are called upon often, when the heart's action is increased by the use of alcohol, to make sudden and violent efforts. Amongst agricultural labourers, on the other hand, who, (though subject to great bodily fatigue) generally lead a life of temperance, and have their minds free from anxiety, the disease is comparatively rare. The above remarks are intended to apply particularly to those in the lower ranks of life ; but the complaint is not uncommon among individuals in a higher station, especially those accustomed to live freely or to use athletic exercises, such as cricketing, running, hunting, and other field sports ; amusements almost peculiar to the inhabitants of this country.

According to the Report of the Registrar-General, it appears that the number of deaths from aneurism in England and Wales, during five years (from 1838 to 1842), was 593, making an annual average of one in about every 131,580 of the inhabitants. From these returns no estimate can be formed of the prevalence of external aneurisms, as they are generally cured by operation. It is also difficult to come to accurate conclusions as to the comparative frequency of this disease in the agricultural and manufacturing districts. In Suffolk,

Norfolk, and Essex (agricultural counties), the number of deaths from aneurism, during the five years, was 35, being about one in every 148,666 persons. In Wales, during the same period, only 19 deaths occurred, amounting to one in every 355,866. In Gloucestershire, Herefordshire, Shropshire, Worcestershire, Staffordshire and Warwickshire, 70 is the aggregate number of deaths reported, being one in every 135,815. In Yorkshire 31 deaths took place, averaging about one in every 258,749. When, however, it is recollected that in more than 8000 deaths which occur annually, the causes are unaccounted for, and that many of the sudden deaths are attributed to apoplexy, a disease which is seldom instantly fatal, it may reasonably be inferred that the mortality from this cause is much greater than the foregoing averages would, at first sight, lead the reader to suppose. The only positive deduction from these returns is, that internal aneurisms are more frequent in town than in country districts; and that in the latter, the great majority of cases do not occur amongst agricultural labourers. The three patients operated upon by Mr. Crosse, of Norwich, for inguinal aneurism, were employed on the water. Mr. Bullen, surgeon to the Ipswich Hospital, informs me that "not one case of spontaneous aneurism has been admitted into the East Suffolk Hospital since its establishment ten years ago, nor does he ever remember to have seen a single case in the agricultural population of that neighbourhood during thirty years;" he adds, "I may have seen five or six cases of aneurism of the aorta in this period, all, if I remember right, occurring in sailors."

The information I have obtained from the Bury, Cambridge, and Colchester Hospitals is to the same effect.

Next to England, this disease is probably more prevalent in the United States of America, where the habits of the people in some measure resemble our own. I have no means of instituting an accurate comparison between the frequency of aneurism in this and other countries, and I can only form my opinion from the number of recorded cases.

In the '*Annales de la Chirurgie*,' 1841, Mott is said to have tied the femoral artery 49 times, the common carotid 19, and the external iliac 6. The greater number of these operations were probably for spontaneous aneurism.

M. Roux¹ says, "aneurism, particularly external, is a disease more frequent in England than in France," and he attributes its greater prevalence in this country, to the kind of life and the nature of the occupations of the people. This opinion is fully borne out by a careful examination which I have made of the French journals. M. Malgaigne,² in relating a case of ligature of the external iliac, at the Royal Academy of Sciences, July 1844, stated, "that at that time he could count only four successful issues in Paris."

Judging from the number of cases reported by Scarpa,³ who was surgeon to the hospital at Pavia, and from the undermentioned statement of Dr. Oppenheim, aneurism is not a very frequent disease in Italy; thus, Scarpa in his work on 'Aneurism,' has reported only ten cases of spontaneous aneurism occurring in various parts of Italy; these were either in his own practice, or seen by him after death.

Dr. Oppenheim,⁴ in his account of the state of medicine in Italy, 1825, remarks, "diseases of the large arteries are so unfrequent at Pisa, that there had been no operation there for aneurism during ten years." Dr. Oppenheim, however, saw one case of popliteal aneurism in an otherwise healthy man.

Aneurisms are not common in Rome; their cure is generally attempted according to Valsalva's method. The Roman surgeons have hitherto never attempted to tie the artery in this disease, but always proceed at once to amputation, when Valsalva's method fails! and yet Rome is scarcely three days' journey from the residence of Scarpa!

East Indies.—The following interesting information I obtained from my friend Mr. C. S. Webber, late surgeon-superintendent in the Colonial Emigration Service.

"With respect to the inquiries you wished me to make on the subject of diseased heart and arteries, I am sorry they have not resulted in the acquirement of any positive information; the few facts I have been able to obtain being almost entirely of a negative character. Among the natives here,

¹ *Parallèle de la Chirurgie Angloise avec la Chirurgie Française*, 1815.

² *Medical Times*.

³ Scarpa on Aneurism, 1808. Wishart's Translation.

⁴ Vol. xxvi of the *Edinburgh Medical and Surgical Journal*.

including the Parsees as well as the Hindoos, aneurism appears to be, if not altogether unknown, a disease of the rarest occurrence; organic disease of the heart almost equally so. I say 'almost,' because in the course of my researches, I met with several cases recorded under the head of 'asthma,' some of which I suspect were complicated with disease of the heart, although that question seems to have been left untouched in the details. I twice visited the principal native hospital of Bombay, which is situated (immediately contiguous to the Grant College) at Bycullah, and went over the whole Register of Cases for the years 1843 and 1844, comprehending for the former year, 2067; for the latter, 2258—total, 4325. Among which, no record of diseased heart or arteries was found (in the same period the cases of phthisis were 21). The principal medical officer, Dr. Morehead, told me that he could not call a single case to his recollection. The assistant-surgeon, Dr. Peale, assured me, that during three years' service afloat in the Indian navy, with crews of Europeans and natives mingled, he had not seen a case (Dr. Morehead had some remembrance of having seen aneurism in the native, but very rarely indeed, and could not call to mind any details). The names of heart disease, or aneurism, do not occur in the Government Forms of Return. I repeatedly visited the European hospital at Bombay (number of beds 150). Dr. Graham, the principal medical officer, informs me, that the diseases in question are, in his experience, of very rare occurrence. Dr. Peat, the resident surgeon, has had no case under his care during his period of charge. He kindly assisted me in going over the Register of Cases for about the last twelve months; and although we minutely examined all suspicious cases, such as fatal attacks of rheumatic fever, with post-mortem inspections, &c., we found no instance of organic disease of the circulatory system. Functional disorder of the heart is not uncommon. Dr. Grierson, of the Lunatic Asylum and Hospital at Colabah (which I visited), confirms the statements previously obtained; and Dr. Burns, K. H., tells me, that during five years' experience as secretary to the principal Medical Board of Western India, he does not remember to have seen a case of aneurism, or organic disease of the heart. Dr. Hunter, of the Queen's

Bays, an experienced stethoscopist, who published a paper in the 'Transactions of the Medical and Physical Society of Bombay,' last year, attributes the "frequency of disease of the heart and larger vessels in European troops at Poonah (Western India) to the practice of subjecting the soldier to active duty, whilst closely buttoned up in his accoutrements, thus compelling him to undergo violent exertion, whilst the chest and neck are tightly compressed."

West Indies.—Mr. Stevens, in the fifth volume of the 'Medico-Chirurgical Transactions,' relating a case of gluteal aneurism in a negress (Table, No. 24), says, "this was the only case of aneurism that I either saw or heard of, during a residence of nearly four years in the West Indies. In St. Croix, St. Vincent's, St. Kitt's, and some other islands, so seldom is it met with, that I know practitioners who, during thirty years' extensive practice have never seen a case of aneurism, stone, or any other disease produced by the deposition of calcareous matter. What is aneurism, that it should be so frequently met with in some countries, so seldom in others? Is it a disease produced by passions of the mind—the improper use of spirituous liquors—the excessive use of mercury—too much exercise—blows, and lifting heavy burdens? If it is brought on by these causes, why is it not met with indiscriminately all over the world? Why are the arteries of the West Indian so free from aneurism, and those of the European so subject to the disease?—The arteries of the European who has been seasoned to the West Indies, of the creole, and the negro, are as subject to the above causes, as the arteries of the European, but they are not liable to aneurism. It is not a disease invariably formed by the rupture of the internal coats of an artery. The arteries of the West Indian are free from aneurism, though as subject as the arteries of the European to every kind of accident which might tear or rupture their internal coats."

Dr. Ferguson, of Kingston, Jamaica, has kindly furnished me with the following information.

"In persons advanced in life, we have frequently degeneration of the lining membrane of the heart, and of the root of

the aorta and its valves. In regard to aneurism, I believe this to be more common in the thoracic and abdominal aorta, than in the other arteries. Aneurism *without* the great cavities, I believe to be much less frequent here than in England. I have been engaged in extensive practice in this large city, containing about 40,000 inhabitants, for about twenty-five years, and to a considerable extent in hospital practice; and for a great many years I had the superintendence of a large prison. From all these sources I have endeavoured to recollect the cases of aneurism that have come under my notice, and I am somewhat surprised to find that they do not amount to more than six or seven. Three were cases of popliteal aneurism, in which the femoral artery was tied. Two were cases of the disease in the arteries of the foot, one behind the inner ankle, the other on the dorsum; the latter of these two might be called traumatic, as it was produced by a heavy body falling on the foot. The sixth case was that of a white sailor, but it is not applicable to our question, as he brought the disease with him. Two of the popliteal cases occurred in white natives, the remaining three cases in black men.

“As bearing on the question of aneurism and disease of the arteries, I may mention that secondary hemorrhage after amputation (an operation necessarily of very common occurrence in negroes, in consequence of the injuries and the horrible ulcers to which they are liable), is of very unfrequent occurrence; this would seem to show that an unsound state of the artery is rare, otherwise the ligatures would occasionally prove ineffectual.”

Through my friend Mr. Webber, I have also obtained the following interesting communication from Dr. Brown, of Grenada, who says—

“Aneurism is a rare disease in Grenada. During a practice of twenty-seven years, I have only met with three decided cases, on two of which I operated. The first, a field labourer (black, and a slave), aged about 57 to 60, in 1818. The artery tied in the upper third of the thigh; the ligature separated on the 8th or 9th day, and recovery was rapid. The man died of old age in 1840.

“The second (popliteal also) was operated on as above, and the ligature came away in about the same period. The case went on moderately well for eight or ten weeks, but the absorption of the tumour was never perfected. This case occurred in 1822, and as far as my recollection serves me, having no notes of the case, the sac filled rather suddenly and eventually burst: much blood was lost; when, after consultation, it was determined to cut down into the popliteal space, and secure the artery above and below, which was done; but the man, also black and a field labourer, aged about 45 to 50, sunk some thirty hours after the last operation, though the bleeding was overcome. On examining the point of the first operation, the artery was quite obliterated; and at those of the second, clots had formed.

“The last case was also in a black man, then free, but he had been a domestic servant. The ascending aorta was the seat, and several of the ribs posteriorly were absorbed, the tumour protruding several inches beyond the general surface. I did not witness the termination, but understood that rupture of the sac took place. He died about 1835, being ten or twelve years after he had first complained.

“I have seen one or two cases where pulsating tumours existed in the chest or abdomen, but had no means of verifying them. My practice extended over a population of from six to seven thousand during the above periods when slavery existed, and since the emancipation no such case has occurred to me.”

The subjoined Table comprises an abstract from Major Tulloch's ‘Statistical Reports on the Sickness, Mortality, and Invaliding among the troops in the United Kingdom, Mediterranean, and British America, prepared from the Records of the Army Medical Department, and War-Office Returns;’ and is introduced with the view of instituting a comparison between the frequency of aneurism in the Cavalry and in the Infantry of the British empire.

Major Tulloch's Reports extend over periods varying from six to twenty years; but, as for the present purpose, it is

necessary that each return should comprehend the same duration of time it has been requisite in forming the accompanying abstract, to adopt the minimum as a standard for the whole.

There are some interesting circumstances connected with these Reports, which, I confess, are not easy of explanation.

In the official returns from the Bermudas, which comprise a period of twenty years, the average annual strength of the troops being 593, not a single case of aneurism occurs. The Cape of Good Hope Reports include two districts: the "Cape," properly so called, and the "Eastern Frontier." In the first of these, the number of men averaging 1195 annually, the cases, throughout nineteen years, amount to eight; whereas, in the Frontier District (where the duty is probably more laborious) they are equally numerous; although the annual strength is scarcely half that of the former, and the period comprehended one third less. In the West India Returns, extending over rather more than seven years, the average annual strength being 3246, a solitary case appears; whilst in Ceylon the proportion is comparatively five to one. Only one case is reported among the officers throughout the whole of the original tables, to which, it must be remembered, these observations apply.

I shall content myself by giving the abstract without further comment, leaving it to those who are more conversant with the various localities, as well as with the nature of service and habits of the soldier at different stations, to draw their own inferences.

I have not been able to obtain any returns from the Artillery, but I have little doubt that in this branch of the service aneurism is more frequent than in any other.

TABLE.

<i>Description of troops.</i>	<i>Station.</i>	<i>Average annual strength.</i>	<i>Aggregate strength of six years.</i>	<i>Cases admitted.</i>	<i>Deaths.</i>	
Dragoon Guards and Dragoons	United Kingdom	6228	37,370	8	5	} Cavalry, 1 in 4944.
Household Cavalry	Do.	1188	7128		1	
Infantry (Foot Guards)	Do.	4816	28,896		6	
Infantry	West Indies	3436	20,616		1	} Infantry, 1 in 6505.
Do.	Gibraltar	3298	19,788	3	2	
Do. (Officers ¹)	Do.	134	809			
Do.	Malta	2140	12,845			
Do. (Officers)	Do.	103	619			
Do.	Ionian Islands	3517	21,103	2	2	
Do. (Officers)	Do.	142	852			
Do.	Bermudas	874	5245			
Do.	N. Brunswick and N. Scotia	2311	13,869	3	1	
Do.	Canada	2901	17,407	1		
Do. (Officers)	Do.	145	872			
Do.	Sierra Leone	6	40			
Do. (Native Troops)	Do.	418	2509			
Do. (Europeans)	St. Helena	984	5908			
Do.	Cape of Good Hope	1034	6209	7	3	
Do. (Officers)	Do.	102	617			
Do.	Do. (Frontier)	578	3471	4	2	
Do. (Native Troops)	Do.	246	1478	1	1	
Do. (Europeans)	Mauritius	1934	11,607	2	1	
Do. (Officers)	Do.	103	619			
Do. (Native Troops)	Do.	112	672	1	1	
Do. (Europeans)	Ceylon	2083	12,501	3	2	
Do. (Officers)	Do.	165	993			
Do. (Malays)	Do.	1998	11,991			
Do. (Native Pioneers)	Do.	1161	6967			
Do. (Gun Lascars)	Do.	175	1050			
Do. (Lascareyns)	Do.	290	1745			
Do. (Europeans)	Moelmyne	628	3773			

¹ Where the term "officers" is inserted, the diseases of officers have been found reported in a separate table. Fractions have been omitted to avoid unnecessary complication.

INTERNAL ANEURISM.

In speaking hereafter of external aneurisms, I shall include those which are within reach of surgical operation ; thus the iliacs, the innominate, and a portion of the carotid and subclavian are within the cavities of the chest and abdomen ; and, therefore, strictly speaking, are internal aneurisms ; but as they come more particularly under the notice of the surgeon, I have for the sake of convenience placed them amongst the former.

Situation.—Of 243 cases of internal aneurism, 175 were in the thoracic aorta, 59 in the abdominal and its branches, 2 in the pulmonary artery, and 7 in the cerebral ; of these, 198 were males and 45 females. Their ages were as follow.

Age.—Between ten and twenty, 3 ; twenty and thirty, 23 ; thirty and forty, 82 ; forty and fifty, 62 ; fifty and sixty, 33 ; sixty and seventy, 13 ; seventy and eighty, 4 ; eighty and ninety, 1 ; not stated, 22.

Occupations.—The occupations are mentioned in ninety-five cases only. Of these, 14 were gentlemen¹ and professional men (including three medical practitioners), 13 soldiers, 9 sailors, 7 labourers, 4 shoemakers, 4 porters, 4 coachmen, 4 gardeners, 3 masons, 2 bakers, 2 butchers, 2 travelling clerks, 2 carpenters, 2 mechanics, 2 slaters, 2 blacksmiths, and 1 of each of the undermentioned :—innkeeper, sawyer, silversmith, builder, glass-cutter, bricklayer, carman, nailer, butler, weaver, corn-chandler, locksmith, keelman, lath-render, policeman, waterman, cattle dealer, quarryman, and coal-heaver.

Unfortunately aneurisms of the thoracic and abdominal aorta are inaccessible to surgical treatment, but as the knowledge of

¹ It must be borne in mind that when this disease affects individuals in the middle and higher ranks of life that the occupation is generally stated, so that probably those cases in which it is omitted have occurred principally amongst mechanics and labourers.

their existence as connected with most surgical operations is of great importance, I shall devote more space to their consideration than is generally allotted by surgical writers.

Sir Astley Cooper lost a patient during the operation for popliteal aneurism, from the bursting of a small aneurism of the ascending aorta. Four cases of a similar kind are related in the Table as occurring during or after the operation.

Symptoms and diagnosis.—The signs of thoracic aneurism are, in many instances, so obscure that the disease is often unsuspected until it is revealed by a post-mortem examination. I have met with numerous examples of large aneurisms in the chest, which were not discovered by experienced stethoscopists, and I have lately seen a case of supposed subclavian aneurism, in which the ligature of the artery was contemplated; the man, however, died suddenly, and the aneurism was found in the arch of the aorta. Laennec believed that there was no sign pathognomonic of thoracic aneurism, except the external tumour. The symptoms resulting from thoracic aneurism depend much upon its situation, size, pressure on the surrounding parts, and the condition of the heart and valves. When seated in the ascending aorta, the sac is generally smaller, and the pulsation is heard more on the right side; and if the tumour points externally, it is situated mostly on the right of the sternum: when occupying the arch and ascending portion of the aorta; in the former it generally extends upwards, and in the latter towards the left side of the spinal column; often producing absorption of the bony part of the canal, and occasionally protruding externally. The pressure may take place on the lungs, trachea, bronchi, recurrent laryngeal nerves, producing dyspnœa, orthopnœa, hæmoptysis, loss of voice, and a sense of suffocation: on the œsophagus occasioning dysphagia: on the vena cava and thoracic duct, producing, in the first, turgescence of the external jugulars, and in rare examples, obliteration of the cava; in the second, emaciation and derangement of the assimilative functions. Pains, sometimes of a dull, at others of a lancinating character are felt over the seat of the tumour, these often extend to the shoulder, elbow, and fingers. In one instance (Case 3) I have seen œdema of the hand: some patients have an

anxious countenance, are troubled with frightful dreams, startings from sleep, &c. ; in others, dyspeptic symptoms are present, such as flatulence, acidity, and eructations. This derangement of the functions of the stomach, in consequence of the pressure of the sac on the pneumogastric or sympathetic nerves, is a very common attendant upon thoracic aneurism ; and numerous patients who have laboured under this affection have been treated for indigestion. The most frequent error committed in the diagnosis of internal aneurism, is the attributing the pains so often met with in the chest, and occasionally in the arms and shoulders, to rheumatism. If the symptoms, however, are well investigated, and the peculiar character of the pain is taken into account, these errors will be less frequent ; thus the patient will, in some cases, complain of pain after a blow, strain, or fall ; sometimes after great bodily exertion or mental excitement. The nature of the pain will depend much upon the parts pressed upon ; if bony structures be involved, it will be of a dull, heavy, aching character, sometimes shooting and lancinating, at others burning. In some cases, where the aneurismal tumour is small, and the adjoining structures not implicated, but little, if any pain is present. In some rare examples where the sac is large, and the structure and position of the parts around much altered, but slight suffering has been experienced. Dr. Law,¹ of Dublin, attaches much importance, and I think properly, to the dull aching pain in the back, which is frequently present. He says, "on the whole then, the pain when present seems to us the least doubtful sign of aortic aneurism. At least we feel bound to say, its beacon light has guided us more than any other to detect disease." Some patients feel distinct pulsation on pressing the spine against a hard substance ; and a good method of diagnosis, according to Dr. O'Bryen,² is placing one hand on the sternum and another on the back.

Pulse.—If obstruction exist in the innominate or subclavian, the pulsation of the radial artery of the affected side will be less distinct, and in some cases absent, (Cases 1, 2, 11) ; if, however, these arteries contain no fibrinous deposit, and their

¹ Dublin Journal, vol. xxiv, p. 475.

² Ibid.

caliber is not diminished, the pulsation may be stronger on the side affected. Mr. Hodgson says, "the pulse at the wrist is generally feeble and intermitting; the action of the heart irregular, and attended with frequent palpitations; there is a sense of constriction across the chest, with an intense pain extending from the sternum down the arms, and a difficulty in respiration proportionate to the size of the tumour."

This, I am convinced from frequent observation, is a mistake; the pulse in aneurism being seldom irregular, and when this symptom occurs I believe that it arises from disease of the valves. A very feeble pulse is also uncommon, except towards the termination of the disease, and in some cases of large aneurisms. I have lately had an opportunity of watching three patients with aneurism of the ascending aorta; the pulse in all was regular, synchronous with the heart, tolerably full, and in two of the cases did not present the slightest indication of disease, in the other it was rather jerky.

Dr. Billing has described a state of pulse, which he calls "resilient," as characteristic of aortic aneurism.

Physical signs.—Dulness on percussion, bellows and file sounds, single and double pulsation, diastolic murmur, purring tremor, wheezing respiration, &c. have been heard in different cases: these sounds, however, are so often produced by various other lesions, such as dilatation and ossification of the aorta, diseased valves, hypertrophy of the left ventricle, dropsy, and adhesions of the pericardium, that I fear they cannot generally be depended upon. The bellows-sound is mostly heard if the aneurism is small and contains but little coagulum: in large aneurisms filled with coagula, this sound is often absent. Dr. Law¹ and others believe that a double sound is generally present in thoracic aneurism. In ten cases of aneurism of the thoracic aorta which I have lately seen, I have only heard this sound in one instance, and in this case it is not constant: the patient is, I believe, labouring under aneurism of the arch of the aorta; the sac pressing upon the right bronchus, the double sound is sometimes very distinct under the right clavicle, and decreases in force as the stethoscope approaches the heart. I

¹ Before cited.

am not disposed to attach much importance to this sign as a diagnostic mark of internal aneurism, for it must be borne in mind that the sounds of the heart are often heard over every part of the chest, and in some delicate females I have heard the heart's sounds almost as distinctly in the neck, as when the stethoscope was applied to the cardiac region.

It is not necessary for me to allude to the various discrepancies which exist among writers respecting the physical signs of thoracic aneurism. These differences I think have arisen from the deduction of inferences from a very limited number of observations, as well as from the impossibility of accurately describing sound. Thus I have heard various opinions given by medical men whilst examining the same patient, one calling the sound double, another single, by a third it would be denominated—bellows-sound, by a fourth no abnormal sound could be recognized, and I fear (as long as we have these different perceptions of sound) that no very accurate results will be arrived at. I know that these remarks will be considered heterodox by some experienced auscultators, but I believe them to be correct. One great source of error in the diagnosis of internal aneurism, has been the assumption that nearly the same sounds are heard in all cases; some insisting upon the presence of a single sound, others, of a double sound, corresponding with the sounds of the heart; whilst a more recent writer, Gendrin,¹ states that a double bruit de choc is generally heard, the second bruit not being perfectly isochronous with the diastole of the ventricle. I have had an opportunity of examining attentively several cases of thoracic aneurism during the last few years, and I confess that I have not met with the same sounds in any two instances. The signs furnished by an aneurismal dilatation will depend so much upon the size and situation of the tumour, the consistence of its contents, the roughness or smoothness of its sides, the force of the heart's action, and a variety of other circumstances, that it is scarcely to be expected that anything like uniformity of sound can be present. Aneurisms of large size may exist without any abnormal bruit; numerous examples of this kind

¹ Revue Médicale, 1845.

are on record: three have occurred lately at St. Thomas's Hospital, one of these very recently. A coal-whipper, aged 37, was admitted for supposed disease of the chest: he complained of pain in the pectoral muscle, which he attributed to a strain he received six weeks before his admission. The chest was carefully examined, and as no disease could be detected he was transferred to the surgeon, who applied a blister, &c. and he left the hospital: after eleven days, he returned to his employment, and seven weeks from the time of leaving the hospital he died suddenly after breakfast, whilst attempting to lift a heavy weight. Two aneurisms were found in the ascending aorta, the upper one as large as an orange; the lower and smaller, about the size of a hazel nut; this had burst into the pericardium. It must be recollected that I am not alluding to cases where the existence of aneurism had not been suspected, but to examples where abnormal sounds had been sought for.

Although thoracic aneurism in the absence of external tumour is often extremely difficult of detection, I am disposed to think that its presence may be ascertained in the great majority of cases by a careful investigation of the past and present symptoms, and the habits of the patient. The most important points to be attended to are: the character and duration of the pain if any is present—the state of the pulse at both wrists—the condition of the respiratory apparatus, as well as of the œsophagus—the appearance of the jugular veins—placing the hand over every part of the chest—and the careful observance by the touch and sight of the thoracic parietes. If we are led by present and past symptoms to suspect the existence of aneurism, a careful examination both by percussion and auscultation should be made, and this frequently repeated: the back part of the chest should be examined with much attention, and if abnormal sounds are more distinctly heard in this situation than in the anterior part, the existence of aneurism is rendered more probable. In some cases, before the appearance of the tumour, a circumscribed pulsatory motion may be seen on the right and upper part of the sternum, and should this be present it will greatly facilitate the diagnosis. The existence of a pulsating tumour externally is not always indicative of the presence

of aneurism. I was requested by a medical friend, many years since, to see a case of supposed aneurism of the ascending aorta; there was a pulsating tumour on the right and upper part of the sternum, and without having recourse to auscultation, I came to the conclusion that it was aneurismal. I saw the woman a few weeks afterwards; a large quantity of pus had been discharged from the tumour, and she perfectly recovered.

Dr. M'Donald¹ has related three examples of pulsating empyema, all occurring on the left side of the chest. These cases, by an inattentive observer, are very likely to be mistaken for aneurism.

When the disease has existed for some time, and the sac is of large size, and presses upon important organs, the countenance is usually pallid and anxious, but this appearance is so frequent in other affections, that it is of little value as a diagnostic mark. Aneurisms of considerable size may be present, without the countenance, or in fact any part of the body, exhibiting the slightest indication of disease, and patients may recover from serious accidents (as in Case 10), and even gain flesh, when life is in hourly peril, from the bursting of a large thoracic aneurism.

Pathological effects.—Some thoracic aneurisms are of considerable magnitude. The various pathological collections in this country and on the continent furnish numerous examples of large aneurisms of the thoracic aorta and arch, which produced but slight inconvenience to the patients. When the aneurismal sac ruptures internally, the opening, according to Mr. Hodgson, is occasioned by ulceration; when it bursts into a serous cavity, laceration takes place; the former termination is comparatively rare. Thoracic aneurisms may burst into the left pleura, and posterior mediastinum; rupture into the pericardium has been considered very uncommon. Hodgson only mentions two cases; Laennec never met with an example. Hope says, "it is very rare." *I believe that this mode of termination of aneurism of the ascending aorta is the most frequent.* Rupture may also take place into the lungs, bronchi,

¹ Dublin Journal, vol. xxv.

trachea, pulmonary artery, œsophagus, vena cava, right ventricle, right auricle, anterior mediastinum, thoracic duct, and spinal canal. In some cases the opening is small, and death does not occur until after repeated losses of blood; in others death is produced by pressure on important organs, and some appear to sink without any evident cause. In one example (Case 3), the patient died of pericarditis. The tumour rarely bursts externally, although in some cases, for a considerable time before death, small discharges of blood take place; and death from external hemorrhage appears inevitable; sometimes the external tumour is considerably reduced in size before death, and in five instances it entirely disappeared. The sac not unfrequently gives way in different situations, and its size is increased by successive rents; the escape of the blood being prevented by adhesions to neighbouring parts, thus—when the bony covering of the sternum or ribs is destroyed, the blood is often extravasated under the pectoral muscles. The symptoms by these enlargements are sometimes considerably relieved, especially where the tumour has pressed upon the trachea or bronchi; and hence the impropriety of using external pressure, as some practitioners have suggested.

Ascending aorta.—Of the 98 cases of aneurism of the ascending aorta, (76 males and 22 females) the terminations were as follow :—30 opened into the pericardium, 6 externally, 4 into the left pleura, 1 into the right, 3 into the pulmonary artery, 3 into the right lung, 3 into the superior cava, 2 into the œsophagus, 2 into the right auricle, 2 into the right ventricle, 1 into the left, and 1 into the trachea; 7 died from pressure on the trachea and bronchi, 6 from serous effusion into the pericardium and pleura, 2 from phthisis, 2 from syncope and exhaustion, 2 from coma, 1 from each of the following—regurgitation into the ventricle (Case 224), compression of the vena cava, pressure on the pulmonary artery, cerebral congestion, apoplexy of lung, distension of stomach, pericarditis, bronchitis and hæmoptysis, 4 died suddenly without rupture of the sac, and in 8 the cause of death was doubtful.

Aortic arch.—In 48 cases of aneurism of the arch of the aorta, (35 males and 13 females) 4 opened into the trachea,

2 into the pericardium, 2 into the œsophagus, 2 into the posterior mediastinum, 2 into the right pleura, 2 into the left, 2 into the bronchus, 1 into the pulmonary artery, 1 into the superior cava, 1 into the lung, 1 externally, 12 died from supposed pressure on the trachea and bronchi, 3 from suffocation, 2 of hydrothorax, and 1 from each of the following—pressure on the recurrent laryngeal nerve, pressure on the cava, hæmoptysis, dysentery, serous apoplexy, rupture of the ascending aorta, and external violence, and in six cases the cause of death is not stated.

Descending thoracic.—Of the 21 cases of aneurism of the descending aorta (all occurring in males), 4 opened into the right pleura, 4 into the left, 5 into the œsophagus, 2 into the left bronchus, and 1 into the left lung; 2 died from pressure on the trachea and left bronchus, 1 from exhaustion and suffocation, 1 from apoplexy.

Eight cases are described as aneurism of the thoracic aorta, and their terminations not given.

Of these 175 cases of thoracic aneurism, 10 were gentlemen, 10 soldiers, 7 sailors, 5 labourers, 5 porters, 4 shoemakers, 3 masons, 3 gardeners, 2 carpenters, 2 slaters, 2 mechanics, 2 bakers, 2 blacksmiths, 2 coachmen, and one of each of the following—innkeeper, sawyer, silversmith, quarryman, builder, glass-cutter, butcher, bricklayer, carman, nailer, butler, weaver, cornchandler, tumbler, and washerwoman, and in 101 cases the occupations are not named.

Age.—One under twenty, 11 between twenty and thirty, 58 between thirty and forty, 46 between forty and fifty, 28 between fifty and sixty, 13 between sixty and seventy, 4 between seventy and eighty, 1 between eighty and ninety, and in 13 cases the age is not stated.

Treatment.—Although internal aneurisms are seldom if ever curable, much may be done in many cases towards alleviating the sufferings, and prolonging the life of the patient. The chief indications are mental and bodily quietude, a spare, simple, regimen, small and occasional bleedings if the strength

will permit. Most modern writers on internal aneurisms object to the abstraction of blood, believing that the loss of this fluid has a tendency to prevent coagulation and deposit of fibrine in the sac. I am doubtful whether the loss of small quantities of blood would have this effect; and it is questionable, moreover, whether the deposit of fibrine is so essential to maintain the integrity of the sac as is generally supposed; and it must be recollected that the aneurismal sac will be distended in proportion to the power of contraction of the left ventricle; and that the impulsion of the blood against the sides of the sac, leads to the ultimate destruction of its parietes, or to such an increase of size as to produce death by pressure on the surrounding parts. The old adage, "*Gutta cavat lapidem, non vi sed sæpe cadendo*," is not, I believe, entirely applicable to aneurism, the force having probably more to do with the destruction of the sac than the frequency of the impulse. I have, in several cases, seen immediate relief from the loss of six or eight ounces of blood at regular intervals, and in Case 7 the benefit from small bleedings was very apparent, both as regards the diminution of pain and the prolongation of life. Some practitioners have placed much confidence in the administration of digitalis. I think, that in internal aneurism, when complicated as it frequently is, with disease of the heart and valves, it should be given with great caution. The diacetate of lead has also been recommended. I have had no experience as to its internal administration, but in two cases I have witnessed great apparent relief from the constant application of cold lead lotions to the tumour. It must be borne in mind, that the patient's sufferings in this, and in other fatal diseases, may be greatly lessened by the use of means which, although they may not afford permanent relief, will probably mitigate the bodily pain, and, by occupying the attention, greatly diminish the mental anxiety. Where much pain is present, the preparations of opium will afford the greatest relief; and, in some cases, large doses of this drug may be given. A patient of mine, who suffered excruciating pain in the right arm and shoulder, found great comfort from sprinkling the raw surface produced by a small blister, with the hydrochlorate of morphia. Belladonna and opiate plasters have also been found beneficial. If the stomach be affected

with flatulence, or acidity, carminatives and antacids will be useful. The diet of the patient is, perhaps, one of the most important considerations in the treatment of aneurism: it should be as simple as possible, and all nourishment of a stimulating character should be avoided; indeed, anything that produces increased action of the heart is likely to be injurious. Unfortunately but few patients will submit to the rules enjoined. The appetite is often craving, and the general health tolerably good. Some have experienced great relief after eating, whilst in other cases the pain has been aggravated after a meal. The treatment recommended by Valsalva, Albertini, and Pellatin, is now I believe seldom resorted to. Some of the patients, according to Valsalva's method, were confined to four ounces of solids and six ounces of fluids, in the twenty-four hours. Many have doubted whether aneurism really existed in most of the persons thus treated, and considering the extreme difficulty of the diagnosis in many instances of thoracic aneurism, the supposition is not unlikely to be correct.

I have selected the following examples of thoracic aneurism from my case-book, believing that they have all a practical bearing upon the subject.

CASE I.

April 27, 1834. I was requested to visit Mrs. M., a laundress, aged 54, residing at Camberwell. She has been in a bad state of health for some years, but was able to attend to her business till within the last few days. Her symptoms now are the following:—difficult respiration, pains on the left side of the chest; a fixed pain also on the left of the spine, with inability to remain in the recumbent position; great anxiety of countenance; pulse small and feeble at the right wrist—*a mere vibratory motion is felt in the left radial, and this only at intervals*; no external enlargement of the chest; no respiratory murmur heard in the greater part of the left lung, but perfectly natural in every part of the right: the sounds of the heart scarcely audible, dulness on percussion over the left side of the

chest. Ordered a blister to be applied to the region of the heart, and gave squills and small doses of blue pill. She continued nearly in the above state till May 1st, when, whilst sitting upon the bed, she suddenly fell backwards and expired.

I examined the body 30 hours after death, assisted by Mr. Beane. On opening the cavity of the chest the pericardium appeared much distended, and was found to contain a large quantity of serum and coagulated blood. A small opening was observed in the left side of the aorta, near its origin, through which the blood had escaped into the pericardium. An aneurism was found at the left side of the arch of the aorta (about the size of two large oranges), the sides of the sac lined with layers of brown fibrinous deposit; this was very abundant near the left subclavian, so that only a very small quantity of blood could have passed through the vessel. The left lung was very small, the right large and healthy. Nothing remarkable in the appearance of the abdominal viscera. The brain not examined.

In this case I did not suspect the existence of aneurism, although the dulness on percussion as well as the smallness of the pulse at the left wrist should have directed my attention to the disease. If the patient had been seen earlier the diagnosis would probably have been more easy.

CASE II.

May 15, 1836. I was consulted by Mr. S., a corn-chandler, aged 38. He has been subject to hoarseness and cough, the latter has of late been very troublesome, and attended at intervals with considerable loss of florid blood. Some time since he had abscesses on various parts of the chest, and about five years ago violent pain in the left shoulder and back, extending down the arm and forearm; this continued for some time, and was considered rheumatic by his medical attendant, and treated accordingly. Another medical man afterwards saw him, who told him that "he had no pulsation in the left arm." He was also examined about three years since by Mr. Silvester, a

medical practitioner, who tells me that, "at that period, he found no pulsation in any of the arteries of the left arm." I have now examined the arteries of the arm (the axillary and brachial with great care) and can discover no pulsation in any of them: this arm and hand are frequently cold and much weaker than the other—the right pulse 80, and rather feeble. Respiration is perfect in both lungs, no bruit de soufflet or abnormal sound.

June 14. He has taken medicine occasionally for the cough and considered himself better. Has frequently expectorated a large quantity of florid blood, which came away with a sudden gush, but he suffered no pain, and has been able to follow his employment. This evening, whilst attempting to lift a box, he was seized with difficulty of breathing and a sense of suffocation; he referred his uneasiness to the upper part of the sternum, saying that "there was something which wanted to come away from the chest." Countenance extremely anxious. He had vomited several times, and remained in this state an hour before I saw him. I took $\frac{3}{4}$ viij of blood from the arm, which somewhat relieved him—applied mustard poultices to the feet and chest, and gave small doses of ipecacuanha wine and sulphuric ether.

June 15. Is much relieved, but complains of a sense of weight and oppression at the upper part of the sternum: frequent vomiting during the fore part of the night; expectoration of mucus tinged with blood; pulse rather feeble, 80. No difficulty in lying in the recumbent position. I examined the chest again with the stethoscope. The result as before.

Eight p.m. Much the same as in the morning. Empl. lyttæ sterno.

16th Says that he is "much better, and that the uneasy sensation about the sternum is gone." No vomiting.

Six p.m. Was suddenly seized with difficulty of breathing. About a pint of blood issued from the mouth, and he immediately expired.

I examined the body 24 hours after death, assisted by Messrs. Waterworth and Leonard. External appearance, plump and muscular. Several large cicatrices on the chest, with varicose veins. No visible enlargement.

The chest was first opened, and the lungs (which were perfectly healthy) removed. A tumour, about the size of a small orange, was felt at the arch of the aorta. The vessels were then divided near the clavicles, and the trachea, heart, and aorta removed together. The trachea was slit open from behind, and at about an inch and a half above its bifurcation, it was found that a contraction had been produced in consequence of the projection of the aneurismal sac. The mucous membrane was considerably reddened to the extent of an inch, and slightly abraded. Five small openings were observed, the largest of which would admit a common-sized probe, into the others a bristle would scarcely pass; from these blood issued on pressure, and on cutting into the aorta. the aneurismal sac (which was situated between the innominate and left carotid) was found to be filled with fibrinous coagulum. A membranous deposit extended from the innominate to the left carotid, so as nearly to isolate the sac. The orifices of the innominate and left carotid were perfectly open, and the coats of the vessels healthy. Around the origin of the left subclavian were bony spiculæ and adherent fibrinous coagula, not entirely blocking up the mouth of the vessel. The interior of the artery was lined with false membrane, so that it appeared double its natural thickness, and felt hard externally. The ascending aorta was also double its natural thickness, and lined with false membrane of a dense, elastic character. The heart was large from great hypertrophy of the left ventricle. Nothing abnormal about the abdominal viscera. The brain not examined. Removed about two inches of the brachial artery; it was very small, and contained a long fibrinous deposit, the size of a small thread. The descending aorta of its natural caliber, but covered in various parts with atheromatous deposit.

The preparation is in the College Museum, No. 1655.

When I first saw this patient I did not suppose that he suffered from aneurism, but after a few days I came to the conclusion that this disease existed at the arch of the aorta, involving the innominate and left subclavian, although the stethoscopic signs did not assist me in my diagnosis. The peculiar state of the breathing, combined with hæmoptysis and absence of pulsation in the left arm, enabled me to form a

correct opinion. There are two interesting features in this case : first, the frequent and continued loss of blood through the apertures in the trachea (I have met with two similar instances, but they are not common), and next the absence of pulsation in the left arm, occasioned, I think, by arteritis which probably took place at the time of the formation of the aneurism, the inflammation occasioned by the rupture of the coats extending along the subclavian and axillary arteries.

CASE III.

Dec. 9, 1839. Mr. C. aged 64. In the early part of his life he was an assistant surgeon in the navy, and has enjoyed good health till about two years since, when he suffered much from acute pain in the top of the right shoulder, extending to the dorsum of the scapula ; the right hand for some days was painful and œdematous ; this pain, as well as the pain at the shoulder, were considered rheumatic by Dr. W. who at that time attended him ; he was bled largely from the arm, and this was followed by quinine, &c. Dr. R. and other medical men also saw him, many of whom took different views as to the nature of the affection ; rheumatism, neuralgia, bronchitis, and pneumonia, being the supposed maladies.

About twelve months since he directed my attention to a pulsating tumour, situated on the upper and right side of the sternum, between the cartilages of the second and fourth ribs ; this he said he had only noticed a few days before. I examined the chest with the stethoscope, and a rough bellows-sound was very distinctly heard over the tumour. The sounds of the heart were rather louder than natural ; the respiratory murmur perfect in both lungs ; pulse about 80, full and vibrating ; the pulsation in the right radial artery rather stronger than in the left ; but the beats were synchronous. It was too clear that he laboured under aneurism of the ascending aorta ; he believed that it arose from a severe blow on the chest with the fist, given some years since.

I took ʒviii of blood from the arm, and ordered the following lotion to be applied to the tumour.

Acetate of lead, Tincture of opium, of each ʒj ; Water, ʒvj. Mix. for a lotion.

To take no medicine except occasional aperients; to keep generally in the recumbent position; and to observe a very spare regimen. He pursued this plan for some time, but suffering a good deal from dyspepsia accompanied with flatulence, he tried a more stimulating diet, and took medicines of various kinds for the relief of the dyspeptic symptoms; which he said annoyed him more than anything. The lead lotion appeared to give him much relief, and he continued its use for some months; but placing (as he did) implicit confidence in medicine, he was always glad to attend to any of the suggestions of the many medical men, who saw him during his illness. For the last five or six months he has been able to walk some distance; and during the summer was seven weeks in the Isle of Wight. The tumour did not increase in size; the pulse has generally been regular at both wrists (80), the right rather stronger than the left. He continued in this state till Nov. 22d, when (after exposure to cold) he was suddenly attacked while at dinner with acute pain in the right shoulder, followed by a tendency to fainting; his breathing was embarrassed; he had frequent troublesome cough; and a cold clammy sweat; with great anxiety of countenance, and a very feeble and irregular pulse. After this he appeared to improve somewhat till the 26th, when his breathing again became extremely difficult, with fluttering pulse. He then rallied slightly for a short time, and the pulse resumed the stronger and more regular beat; but he was never able to remain in the recumbent position; and complained of great distension of the abdomen, and drowsiness attended with frightful dreams; which continued till the 6th of December, 12 at noon; when his pulse (which had for a short time previous been irregular) became suddenly indistinct; the drowsiness increased, and he expired at 1 p. m. The treatment had consisted in the application of leeches to the seat of pain; and small blisters to various parts of the chest. Digitalis had been given for a short time, with expectorants, alterative mercurials, and frequent stimulants, when he became faint.

I was present at the examination of the body seventy hours after death. The external appearance was rather emaciated. On elevating the sternum, we discovered an aneurismal sac

(about the size of a small orange) adherent to the upper and right side of this bone, and extending to the middle of the cartilages of the second and third ribs; a slight portion of the sternum was absorbed, the sac at this part being deficient, and the bone forming its anterior wall. We next removed the sternum, with a portion of the ribs, and proceeded to examine the lungs: the right cavity of the pleura contained about a pint of dark coloured serum, the left about half a pint: both lungs were adherent at their apices; the structure of the right lung was healthy; the left contained a small quantity of serous infiltration; and the lower part, to a limited extent, was affected with red hepatization. The pericardium contained about eight ounces of bloody serum, on the removal of which, the heart and pericardium were seen covered with irregular deposits of lymph having a cauliflower-like appearance, which were evidently recent, as they were easily detached; the left ventricle was rather hypertrophied, but nothing abnormal was observed in any other part of the heart. The aneurismal sac extended from above the semilunar valves to within the same distance of the origin of the innominata; it contained a small quantity of coagulum, and the lower part was strengthened by a large deposit of fibrine. On the anterior and external portions, the sac, to the size of a sixpence, was much attenuated, and in all probability would have burst in a short time. The arch of the aorta was dilated to some extent; its inner membrane presenting a puckered appearance, with a small abrasion on the upper portion about the size of a pea.

Abdomen.—The viscera had all a congested appearance; the liver of its natural size, but rather granular; the stomach contained a quantity of dark, coffee-coloured fluid; its mucous membrane soft and easily detached, and in some parts of a roseate hue; the kidneys were congested, but their structure normal; a large hydatiginous cyst was attached to the inferior extremity of the left; and a small cyst to the anterior part of the right. The brain not examined.

The most remarkable circumstance connected with this case was the occurrence of pericarditis, a very unusual termination of aneurism. The size of the sac, as well as the smallness

of its contents, will account for the distinctness of the bellows-sound. This affords another instance of the great difficulty of detecting aneurism, before the appearance of the external tumour.

CASE IV.

W. T. aged 47, a labourer of intemperate habits, applied to me November, 1843, in consequence of pain in the upper part of the left side of the chest, extending to the back; he had been subject to it at intervals for years, and thought that it was occasioned by what he called a rick in the back, produced by a fall when carrying a heavy basket of linen some years since. There was nothing remarkable about his pulse or breathing, and I treated him for pleuritis; his wife tells me that the pain in the back was often very severe, he never complained of pulsation in the chest, but he used to say, "that he felt something was gnawing his inside." He was able to attend to his employment (that of wheeling linen in a barrow) the day before he died.

In the morning of January 15th, when in the act of dressing, a small quantity of blood escaped from the mouth, this he took down stairs in the basin to show his wife, when after being in the room two or three minutes he fell down dead; the blood lost from the mouth amounted to about four ounces. I was frequently in the habit of seeing him, but did not again attend him professionally. I heard, however, that he died suddenly, and concluded (although I did not suspect this when I attended him) that he had died of aneurism of the descending aorta. I found that he had been under the care of my friend Mr. Gannon, the parochial surgeon, with whom I examined the body. Mr. G. tells me "that he complained principally of pain in the back, which was treated for rheumatism; his breathing was not affected, and nothing particular was observed about the pulse."

Examination three days, p. m.—The body well formed and muscular; on opening the chest a small coagulum of blood was seen on the right side of the pericardium; the lower part of the left lung appeared considerably enlarged in consequence

of effusion of blood under the pleura; this membrane was ruptured near the diaphragm, and from the rent about four quarts of blood had escaped into the left pleura. The left lung was carefully removed, and an aneurismal sac, the size of a large orange, was seen at the commencement of the descending aorta; this was ruptured at its inner side where in contact with the lung, some of the blood having passed into the substance of the lung, but the greater part between this organ and the pleura, making its exit as before described. The inner part of the bodies of the third, fourth, and fifth dorsal vertebræ were scabrous, and an opening large enough to admit the finger, existed between the third and fourth; over these vertebræ the sac was deficient. The heart was a little larger than natural from hypertrophy of the left ventricle, in every other respect (including the valves) it was quite healthy. The ascending aorta, and part of the arch, much dilated and thickened, the latter condition appeared to arise from hypertrophy of the cellular coat; patches of yellow atheromatous deposit on the ascending aorta and arch, but not very abundant. The abdominal aorta, except its lower part, nearly free from deposit; lining membrane of the descending aorta very red. The aortic valves very large, the free edge of one measured sixteen lines; the lungs normal, liver, kidneys, and the rest of the abdominal viscera healthy. Brain not examined.

I was led to suppose that death in this case was occasioned by the rupture of an aneurism in the descending thoracic aorta, chiefly from the character of the pain in the back, which I believe to be one of the most valuable of the diagnostic marks of aneurism in this part of the vessel. The disease was probably occasioned by the fall, and when the size of the aneurism is considered, it appears extraordinary that the patient was able to attend to his avocations up to the time of his death.

CASE V.

February 28th, 1845. I attended the post-mortem examination of the body of a man, aged 59, who had been for some

time under the care of my friend Mr. Statham, in the Wandsworth road.

From his widow I learnt that he had been a carpenter, had been a free liver, and when young was salivated for syphilis. Twelve years since he was operated upon for popliteal aneurism of the left side by Dr. M'Donnell, of Liverpool: the operation was perfectly successful, and he was soon able to resume his accustomed occupations. He remained in tolerable health until about four years since, when, after suffering for some time from palpitation of the heart, a slight swelling was observed in the right side of the upper part of the sternum; this gradually increased, but he continued his work at intervals, until within six months of his death. He had been under the care of several medical men, but for the last six months Mr. Statham had attended him, and he has kindly furnished me with the following particulars.

“He first came under my notice about six months before his death; at that time his body was much emaciated; he had a hectic flush generally upon his cheeks; complained of headache, and had dyspnœa with a dry troublesome cough; his pulse was quick and feeble; tongue clean; and his appetite good. The tumour, which was on the right side of the chest, was about the size of an egg, and pulsated most distinctly; the skin covering it was thin and discoloured, like that of an abscess as if it were on the point of bursting. He suffered almost continually from a gnawing pain in the affected side, and occasionally from severe darting pains. Soon after I saw him the cuticle gave way, and a slight oozing of blood from the tumour took place, which made him apprehensive that it had burst: the skin, however, soon scabbed over. This state of things was repeated on two or three occasions, and I almost daily expected to hear of his death; but after a short time, to my surprise, I found that the tumour had become flatter and more diffused, and the pulsation less strong, although the pain and other symptoms remained much the same. I do not remember that there was any particular sound audible in the region of the tumour; there was a strong shock, such as

we hear in hypertrophy, but I think nothing else. I lost sight of him for about two months, during which time he had paid a visit to Ireland (his native country), where he led a most intemperate life; but I saw him again on his return about a week before his death, when I was called up in the night to arrest the hemorrhage from the tumour, which had given way. It had again become very prominent, and was livid from blood effused beneath the skin; the blood was poured out in a continuous stream, but was stopped by the application of a sponge and the occurrence of syncope. The same thing happened two or three times over, and he sank under the disease in a few days, presenting one of the most distressing spectacles that can well be imagined."

Autopsy, thirty-six hours after death.

External appearance of the body.—There was a cicatrix three inches in length in the middle third of the left thigh. On the right and upper part of the sternum, extending as far as the shoulder, was a tumour as big as a man's fist, the centre of which was of a dark livid appearance, with an ulcerated spot the size of a half-crown. The sternum and ribs were carefully removed from below. The aneurism, as big as a large orange, commenced in the ascending aorta; the opening into the sac was below the origin of the innominata; the edges smooth, and the lining membrane could be traced a short distance into the sac, where it was seen to terminate abruptly; only a small portion of the coagulum was laminated, and, external to the chest, it presented the ordinary appearance of coagulated blood. The second, third, and fourth ribs near the sternum were destroyed, as well as a portion of the latter bone. The parietes of the right ventricle of the heart about one third thicker than natural; the valves and every other part normal, and perfectly free from deposit; no deposit upon the ascending aorta below the sac, but small patches were observed around the opening: a few bony patches were found upon the descending thoracic and abdominal aorta, but in a less quantity than is generally met with at this stage of the disease. The lungs and abdominal viscera healthy. I then removed the upper and middle thirds of the right femoral, the popliteal, and iliac arteries. The common iliac, before its bifurcation,

was considerably dilated, particularly at its posterior part.¹ The external iliac was much dilated, and the femoral, as far as the profunda, was larger than natural, and the latter vessel was greatly increased in size. Immediately below this artery the femoral was hard and contracted for two inches and a half; it then became very small as far as the opening in the triceps, having a ligamentous appearance. I next made an incision into the ham, and removed the popliteal artery and a considerable portion of the surrounding parts, supposing that in these was included the aneurismal sac; but, on a careful examination of the artery on my return home, no trace of the sac could be found. The vessel was pervious, a fibro-cartilaginous deposit, about half an inch long, partly occupying its upper portion.

CASE VI.

I had frequent opportunities of seeing the two following cases when in St. Thomas's Hospital.

J. M., a sailor, aged 43, was admitted into St. Thomas's Hospital, October 29th, 1844, under the care of Mr. South, with a large pulsating tumour, the size of an orange, on the right side of the sternum, between the cartilages of the second and third ribs; pulse 96, soft and compressible; bowels regular; tongue white; a single shock is heard over the tumour, but no bruit; the sounds of the heart normal. He has been subject to rheumatism at intervals; but has generally enjoyed good health; he is a married man; had gonorrhœa twenty-three years since; has been a hard spirit-drinker. He first complained of pain in the right shoulder and neck about twelve months ago, which he thought at that time to be rheumatism; but about two months afterwards, he perceived a small tumour in the situation named, which has gradually increased up to the present time; more rapidly during the last week, and he is unable to sleep on account of a dull aching pain in the neck and shoulder: he does not remember that he ever received a blow on that part.

¹ The preparation is now in my possession.

Ordered milk diet and half an ounce of castor oil.

November 1st. Very uneasy on account of the pulsation.

V. S. ad 3vj .

2d. Much the same; pulse feeble, 108. Ordered a draught of tincture of hyoscyamus and sulphate of magnesia, three times daily.

5th. Not so well; the tumour much increased since he came in. V. S. ad 3viij .

He left the hospital, and came under the care of my friend Mr. Dalby, at the Surrey Dispensary, who gave me the opportunity of seeing him before he died, and also of being present at the post-mortem examination. When he left the hospital the tumour was as large as a man's fist, occupying the right and upper part of the sternum, and extending as far as the shoulder; one part (opposite the junction of the second rib with the sternum) was very thin and soft, having a dark, bloody appearance, and a few days before his death blood oozed from it in small quantities; it was expected that the swelling would burst at this part; he appeared, however, to die from suffocation, arising probably from pressure on the trachea.

February, 1845. *Autopsy, thirty-six hours after death.*

The tumour presented externally the appearance before described. The clavicles were sawn through at their scapular extremities, and the sternum gradually elevated from below; the swelling was then seen to occupy the upper part of the chest, commencing about two inches from the origin of the aorta; the opening into the sac was an inch and a half in diameter, and was situated at the root of the innominata, its edges smooth and round, the inner membrane being continued a short way into the sac. The aneurism appeared to have been of small size at first; it then burst, the blood passing behind the sternal pleura, and occupying the anterior mediastinum and upper part of the sternum, and an opening was then formed between the second and third ribs close to the sternum; the blood being diffused under the pectoral muscle. The ribs were quite healthy; but the edge of the sternum was absorbed. The external tumour contained coagulated blood, situated under the pectoralis major, and extending as far as the acromion. The coagula were not

distinctly laminated; the left ventricle of the heart was slightly hypertrophied; the semilunar valves and other parts normal. The ascending aorta was free from disease; but small patches of bony deposit were seen around the edges of the opening. The subclavian, and carotids, the arch, and the descending aorta, contained a few patches of atheromatous matter: this was much more abundant in the abdominal aorta, giving the inner lining an irregular, elevated appearance. Lungs healthy; the right smaller than the left. The liver and other abdominal viscera normal. Brain not examined.

I have inserted the two last cases for the purpose of showing that thoracic aneurisms seldom produce death by the sudden loss of a large quantity of blood externally; although in both instances the tumours were livid, and appeared to be on the point of bursting; the deaths were not occasioned by the hemorrhage. Both patients followed their usual occupations after the appearance of the tumours.

CASE VII.

Mary F., aged 26, was admitted into St. Thomas's Hospital, under the care of Mr. South, April 30th, 1844. She had a pulsating tumour on the right and upper part of the sternum; slight bellows-sound was heard over the swelling; the pulse of the same power at both wrists (about 70), and rather feeble. Three months before her admission she received a blow from the fist on the right side of the chest, and on the following day was conscious of a swelling with a fluttering sensation in it; at this time she was suffering from cough, and had not been in a good state of health for three or four months, complaining of shortness of breath, tightness at the chest, and cough. Soon after she perceived the swelling she showed it to her medical attendant, who told her that he thought that it was an aneurism, and advised her trying to obtain admission into the hospital. Any exertion rendered her breathing difficult, but she did not suffer much pain. At the time of her admission her bowels were much confined, and she was ordered calomel, with an enema of house medicine, and put upon milk diet with arrow-root.

May 2d. Somewhat better, but the cough very troublesome. Eight ounces of blood to be taken from the arm.

11th. Better since the last report; complains of tightness at the chest. To be bled again.

June 8th. Not so well. V. S. ad ℥iv .

17th. Much easier since the last report. V. S. ad ℥iv .

29th. V. S. ad ℥iv .

July 6th. Went out to-day in consequence of her mother's illness. Is much easier than when she came in, and there is less pulsation in the tumour.

10th. She came again to the hospital this morning complaining of more difficulty of breathing. Bled to six ounces.

She now returned to Woolwich, her native place, and was attended by Mr. Penny of that town. She died a few months after leaving the hospital, apparently from rupture of the aneurism, but no examination of the body took place.

Mr. Penny informs me that the external tumour disappeared about a month before death. This may be accounted for by the sudden extension of the sac internally.

CASE VIII.

For the history of the subjoined case I am indebted to my friend Mr. Hicks, of Newington. I saw the gentleman who was the subject of it a few days prior to his death, when he appeared in perfect health.

“Mr. D., aged 31, a strong muscular man, with florid complexion; had always led a very active life, and never been the subject of severe disease until his last illness. About eight months since he was thrown from his chaise with great violence, but he did not appear to be injured, for after a short time he drove on as before; was not prevented from attending to his usual duties, and very soon forgot the circumstance altogether. Upon making a close inquiry, however, it seems that he has never been quite so well since that period; being troubled with a short irritating cough, and at times with pain in the

back, though never very severe, which he attributed to rheumatism, and treated but lightly. There was also slight difficulty of breathing occasionally, which was much increased by any active exertion—dancing, running, &c., but this he ascribed to his having become very stout of late, and with the exception of not being able to wear a great coat, in consequence of its pressure on the shoulders, had made no complaint. With these symptoms he continued his usual occupations; neither of his ailments being of sufficient severity to keep him from business even for a day, until March 12th, when suddenly, whilst writing, he was seized with a cough, and he observed that the sputa were tinged with blood; this induced him to consult his friend and relative, Mr. Adams, who advised him to apply leeches, and keep quiet for a day or two.

“March 13th. Much better, and continued so until the evening, when, having a return of the hemorrhage, he sent for Mr. Waterworth, who found him spitting blood in rather large quantities, with the pulse 120, strong and hard; skin hot and dry, and incessant cough. He was immediately bled to 3xij, and in an after consultation with Mr. Adams, ordered to take calomel, antimony, and opium, with some form of saline mixture.

“14th. Very much better; no return of the bleeding; pulse 84, soft and compressible; skin moist, and the cough greatly relieved—in fact, better in every respect. He continued to improve during the day, up to six o'clock, when suddenly being seized with a fainting sensation, he vomited blood in rather a large quantity; fell back, and died instantly.”

“It is right to say that in this case the chest was never submitted to a close examination, the medical attendants thinking it unwise to make the patient exert himself more than was necessary for fear of a return of the hemorrhage, more especially as he was so quickly relieved by the treatment adopted, otherwise perhaps the nature of the disease might have been discovered.”

“On the following day a post-mortem examination was made in the presence of Mr. Adams, Mr. Waterworth, and myself, when the appearances presented were the following.

Externally.—The body exceedingly exsanguine. On making the first incision the body was seen to be covered by a layer of fat, half an inch in thickness.

Thorax.—On opening the chest the lungs appeared healthy, but the upper part of the right lung was slightly infiltrated with bloody serum, and on raising the lung the posterior part of the right pleural cavity was found occupied by three pints of clotted blood and bloody serum; this being taken out and the pleural cavity well sponged and cleaned, the source of the hemorrhage was distinctly seen to be a slight opening in the lateral and inferior part of the right lung. Upon passing a probe into this opening, and dividing the lung by its direction, it was discovered to be the commencement of a channel through the substance of the lung, which terminated in the sac of an aneurism, situated at the posterior part of the arch of the aorta, directly after it has made its turn backwards. The vertebræ were scabrous, and the left side of the sac was formed only by false adhesions, between the lung and vertebral column.

Heart.—Healthy, but covered with fat, as were also all the other organs.

Abdomen.—All the organs healthy, with the exception of the kidneys, which were evidently in the first stage of Bright's disease, being quite mottled."

The aneurism in this gentleman, as in the Cases 3, 4, 7, 10, 11, and 12, was, I believe, occasioned by external violence, and is another exemplification of the frequent occurrence of internal aneurism after falls or blows. It also shows that a person may be healthy in appearance, and able to attend to his usual occupations without inconvenience, when labouring under this formidable disease.

CASE IX.

Mr. Lodge, of Peckham, gave me an opportunity of seeing the following case.

Mr. H. aged 60, strong and muscular, and accustomed to athletic exercises when young, had enjoyed a good state of

health until about six months since, when he complained of pain in the right shoulder, which was considered rheumatic; after this he had an attack of influenza. He came under Mr. Lodge's care December 13th, 1845, having previously been treated by another practitioner for spasmodic asthma. The first time he had suffered any alarming inconvenience in his breathing was about a week or ten days before this time, when, on leaving the omnibus, and walking to his residence, three or four hundred yards from the road, he was suddenly seized with extreme difficulty of breathing, attended with a croupy sound. This state of things continued and increased. The wheezing sound, although occasionally diminished, never entirely ceasing, except during the time he slept.

Jan. 6th, 1846. The symptoms are now as follow :—Breathing quick, and attended with a dry stridulous sound: on any sudden mental excitement the dyspnœa becomes excessive. The pulse about 100, fuller at the right than the left wrist; countenance anxious; appetite good; cannot lie comfortably on the right side; does not complain of pain in any part of the chest, and there is no external tumour.

Stethoscopic signs.—Slight dulness on percussion in the right and upper part of the sternum. The heart's impulse greater than natural, the first sound rather prolonged. On the right of the sternum and under the clavicle, indistinct bellows-murmur is heard. Before the left clavicle, the sounds of the heart are very audible, but the murmur is absent. A distinct pulsation is heard in the back between the upper part of the scapula and the spine. On placing the hand along the course of the aorta, an increased impulse is felt as far as the right clavicle; on the left side this impulse is not observed. A double shock was heard under the right clavicle, but it was not constant; thus, when I first saw the patient this impulse was very audible, but on visiting him a few weeks afterwards it was not perceptible.

But little variation occurred in the symptoms; he suffered frequently from extreme dyspnœa, and was often threatened with suffocation; his voice was nearly reduced to a whisper several weeks before his death, which took place on the 14th of May, 1846, apparently from pressure on the trachea and right bronchus.

Although no post-mortem examination could be obtained, the physical signs, I think, were sufficiently clear, in the absence of external tumour, to indicate the existence of aneurism of the arch of the aorta, involving probably the innominata.

The increased impulse under the right clavicle, the double shock, pulsation heard in the back, stridulous breathing, and loss of voice, I apprehend could not be occasioned by any other disease. In this case I was particularly impressed with the great importance of manual examination, and I would advise in all cases of suspected thoracic aneurism, that a careful application of the hand should be made to every part of the chest. In the instance in question this manual examination appeared to me to furnish more positive signs of the presence of aneurism, than those afforded by auscultation.

CASE X.

The undermentioned case I have had an opportunity of watching during the last few months in Guy's Hospital.

July 22d, 1846. A man, 50 years of age, was admitted into Guy's Hospital with extravasation of urine, under the care of Mr. Key. The lower part of the abdominal integuments were in a sloughy state; large incisions were made into the perineum by Mr. Cock. On the left side of the sternum, between the second and fourth ribs, is a pulsating tumour about the size of a hen's egg; the cartilages of the ribs are partly absorbed, and the integuments are thin but not discoloured. He does not suffer much pain, but has occasional difficulty of breathing, and slight cough: I can discover no abnormal sound; the heart's impulse is slightly increased. About three years since he received a violent blow on the chest from a fist; he suffered much pain at the time, and about eighteen months after this a pulsatory motion was observed in the place mentioned. He was under the care of a surgeon, who applied leather and plaster of Paris to the tumour, for the purpose of preventing its increase. This treatment was continued for several months, and the patient thinks with benefit.

August 4th. The tumour has entirely disappeared, and but

slight pulsation is now perceptible externally: the wounds in the perineum looking well.

¶ Oct. 2d. The man has gradually improved in health, and is able to leave his bed, and the incisions have nearly healed. Mr. Cock says "this extravasation would have killed nine men out of ten." The tumour has entirely disappeared, but there is a slight elastic pulsatory movement between the cartilages of the third and fourth ribs. The sounds as before: the pains in the chest less severe; and he says that "he is much better." There is no sound which could, I think, even to the practised ear, indicate the presence of aneurism.

Nov. 27th. The tumour appears to be increasing towards the centre of the sternum, and this bone on the right side is more elevated than on the left, where there is a general enlargement of the anterior part of the chest. The man, however, although the tumour has evidently increased internally, suffers but little inconvenience when in a state of quietude; *his health has improved; he has gained flesh (probably fourteen pounds since his admission)*, and the only wound which remains in the perineum is nearly closed.

This case is one of the most remarkable of the kind on record, and clearly proves that the existence of a large aneurism does not interfere materially with the reparative process. The disappearance of the external tumour is another feature of great interest; the same occurrence took place in Case 7, page 150. In the Table of Aneurisms five other Cases (69, 306, 319, 431, 432), of a somewhat similar description, are mentioned.

Mr. Gay¹ has related the case of a man, 28 years of age, who was admitted into the Royal Free Hospital on the 25th of March, with a pulsating tumour as large as a walnut on the right of the sternum. Digitalis and the Ant. Potass. Tart. were given, and after the action of the heart and arteries became feeble and irregular, the tumour was lessened in bulk.

On the 3d of July the tumour was no longer observable, and on the 8th the man left the hospital without the know-

¹ Lancet, 1841.

ledge of Mr. Gay, his breathing having become perfectly still, and every symptom so thoroughly alleviated, that he was sure that he could return to his work. Mr. Gay informs me "that he has not seen or heard of the patient since."

Mr. Porter¹ says, "I am aware of a case in which aneurism had proceeded so far as to have caused absorption of the sternum. The tumour pulsated externally with a violence which threatened its bursting almost momentarily; the patient lay on his bed propped up with pillows, expecting nothing but the most miserable death; yet without any obvious cause, and in despite of the prognostics of his attendants, the pulsation suddenly stopped, the tumour subsided, and he is not only alive, but strong and active at this moment."

Mr. Key, some years since, met with a case in some respects similar to the above. A man was admitted into Guy's Hospital with an aneurismal tumour on the right of the sternum: this entirely disappeared, the man left the hospital apparently much better than when he was admitted, but nothing was afterwards heard of him.

CASE XI.

I saw the following case of aneurism of the arch of the aorta several times, through the kindness of Dr. Munk, physician to the Tower Hamlets Dispensary.

July 22d, 1846. A woman, aged 50, applied at the dispensary a few weeks since, in consequence of pain in the chest and arm, slight cough, and difficulty of breathing. There is now a pulsatory motion on the upper part of the sternum, and on pressing the finger behind this bone, at the superior edge, a pulsating tumour can be felt. The sounds of the heart normal; distinct bellows-sound on the left and upper part of the sternum, but not in the centre; pulse at the wrist feeble; more so at the right side.

Three or four years ago her husband knocked her down and stamped upon her chest, and four or five years before this

¹ Before cited, p. 76.

she fell down stairs, her neck being bent to the left side; she felt a good deal of pain in the neck after the accident. She was salivated about eighteen months since for an affection of the throat, but she thinks not intentionally.

August 20th, 1846. I visited her this morning; she has been confined to her bed for several days; has cough; frequent pain under the left clavicle, extending to the elbow; the tumour above the sternum is not so perceptible as before; single bellows-sound, with preternatural impulse, is heard over the upper part of the sternum, and under the clavicles; no pulsation is felt in the brachial arteries. The pain appears to be seated principally under the left clavicle, and is much relieved by the application of belladonna plasters.

September 18th. Since the last report she has had rather less pain, but on the 16th she had four or five slight convulsive fits; and yesterday, *on leaving her bed and resuming the erect posture, she became suddenly unconscious, and exclaimed, "Where am I?"* she did not recover herself for several minutes. *No pulsation can be felt in the carotid and brachial arteries;* there is now no bellows-sound over the tumour, but a double sound is heard similar to that of the heart.

This poor woman remained much in the same state until November 21st, when she gradually sunk.

She was never able to leave her bed, and no pulsation could be felt in the brachial or carotid arteries. A short time before her death she expressed a wish that her body should not be inspected, and on this account no autopsy was permitted.

Although no post-mortem examination was made in this case, I apprehend that little doubt can arise as to the nature of the disease. I believe that an aneurismal swelling was present at the arch of the aorta, accompanied, as in Case 2, page 138, with total or partial plugging of the branches supplying the head and upper extremities. The convulsive fits which came on when the poor woman was in the erect position, were probably occasioned by a deficient supply of blood to the brain.

Case 495, Table of Aneurisms, is a very interesting example of the same kind, published in the 'Provincial Medical and Surgical Journal,' May 1845, by Dr. Durrant. The gentle-

man, a medical man, had a fall from his horse. About eighteen months after this there was complete cessation of pulsation in the arteries of the neck and upper extremities, which continued five or six years, up to the time of his death. Sometimes, "while horizontal, he could see perfectly well; but immediately on assuming the erect position he became either totally blind, or he still, at times, possessed an imperfect vision, distinguishing the face, but unable to discriminate the features at a distance of two or three yards." When in London he consulted Dr. Watson, who says, "I had placed my finger, for a few seconds only, in front of the left sternomastoid muscle, when I saw that his head drooped, his cheeks became white, and he was on the brink of fainting; but he recovered immediately. Then I made similar pressure for a moment on the right side of the neck, and the same phenomena were instantly repeated, with the addition of convulsive jerking movements of the head and arms. He rallied again directly upon my removing my finger, and was scarcely aware of what had happened—for a second or two he had been unconscious."

"On examining the body, the entire arch was seen enormously dilated, and the sac contained more than two thirds of its volume of dense fibrine, resembling muscle. The innominate was slightly dilated; the subclavian and brachial arteries were pervious, but of diminished caliber." The state of the carotids is not mentioned.

CASE XII.

The subjoined is a good example of the occurrence of aneurism at an early age, from the effects of intemperance and external violence.

A poor girl, aged 23, who had led a life of dissipation for several years, was admitted into St. Thomas's Hospital, Oct. 20th, 1846, under the care of Mr. Green, for a large pulsating swelling on the right and upper part of the sternum, which she attributed to a severe blow with the fist received two

years ago. She was also beaten severely about the chest a few months before her admission. She died suddenly ten days after entering the hospital. An aneurism, the size of a large orange, was found at the arch of the aorta, and another rather smaller was seated in the descending thoracic, and the bodies of three of the dorsal vertebræ were partially destroyed by the pressure of the sac. The preparation is in the St. Thomas's Hospital Museum.

CHAPTER IX.

ANEURISM OF THE ABDOMINAL AORTA.

OF fifty-nine cases of aneurism of the abdominal aorta, fifty-one were males and eight females; their occupations were as follow:—three gentlemen, five labourers, three soldiers, two sailors, three coachmen, two porters, a travelling clerk, locksmith, keelman, butcher, policeman, gardener, waterman, cattle dealer, shoemaker, and stoker to an engine. In the remaining thirty-one cases the occupations are not stated.

Age.—Eleven were between twenty and thirty; 22, between thirty and forty; 14, between forty and fifty; and 3, between fifty and sixty; the ages of the remaining 9 are not given.

This affection is not so frequent as aneurism of the thoracic aorta, and its diagnosis is less difficult, although in many instances the disease has not been discovered. Aneurisms of the abdominal aorta may attain a large size; I have examined several specimens of this kind. In the Chatham Museum, there is an immense aneurism of the abdominal aorta, taken from a soldier, who fell from a luggage-cart eighteen months before his death: the coagulum in the sac weighed ten pounds. I have seen another preparation in Mr. Langstaff's Museum, in which the coagulum weighed five pounds and a half. In the Museum of the London Hospital is a large abdominal aneurism which had existed for several years. It commenced at the posterior part of the aorta near the cæliac axis. The sac, which was filled with dense, firm coagulum, and which held just one pailful of water, is formed chiefly by the peritoneum. The abdominal viscera are not so essential to life as the thoracic, and hence these aneurisms occasion less disturbance from pressure on the surrounding parts. The pulsation is generally more distinct than in thoracic aneurism; it is single, and is usually accompanied with a rough bellows-

sound, but in some instances no abnormal sound has been heard. As in thoracic aneurism, the symptoms will in a great measure depend upon the size and direction of the sac, and its pressure on the neighbouring organs. If, as generally happens, a portion of the spinal column be destroyed, there will be a gnawing or aching pain in the back or loins, and this frequently of an acute character. The functions of the stomach, liver, and kidneys, are sometimes much disturbed; vomiting, jaundice, and disordered secretion of urine, resulting from the pressure of the tumour. In some cases, great weakness is felt in the back and loins, attended with impaired muscular power in the lower extremities. Tumours of various kinds in the abdomen, whether solid or fluid, schirrus of the stomach, diseased pancreas and kidneys, enlarged mesenteric glands, encysted, and solid growths in contact with the artery, indurated fæces, air in the colon, lumbar abscess, and what by some is called nervous pulsation of the aorta, may all be mistaken for abdominal aneurism; but the latter is by far the most frequent source of error, and I have known several instances where abdominal pulsation has been thought to arise from aneurismal dilatation, and it often requires much nicety of discrimination to distinguish between them. If the following points, however, are attended to, the diagnosis will be rendered less difficult.

In abdominal aneurism, pain of an aching, tearing, or darting character is often felt. In aortic pulsation the patient seldom complains of pain in the immediate neighbourhood of the aorta. The sound, when heard in abdominal aneurism, is generally a single rough bruit. In aortic pulsation abnormal sound is seldom present. The best diagnostic marks are the following:—In abdominal aneurism the impulse is mostly heaving and confined: in aortic pulsation free and bounding. The direction of the sac in abdominal aneurism is generally lateral or posterior, and the tumour is seldom distinctly felt when seated near the cæliac axis. The state of the abdominal viscera, the sex, age, habits, occupations, and constitutional peculiarities of the patient, are circumstances which must not escape the notice of the medical attendant.

Abdominal aneurism more frequently commences near the cæliac axis, where (as I have before observed) the arterial

tunics are probably somewhat weakened by the origin of the collateral branches; the diameter of the vessel is likewise very perceptibly diminished below this part. In several instances recorded in the Table of Aneurisms, rupture of the sac took place some time before death; the blood finding its way behind the peritoneum. At the time of rupture the pain is very acute, from the detachment of this membrane from its cellular connexions; there is also great depression of the vital powers. After a few hours or days the peritoneum gives way, and the blood escapes into its cavity.

Terminations.—Of the fifty-nine cases of aneurism of the abdominal aorta and its branches, eleven opened behind the peritoneum, ten into the peritoneum, five into the left pleura, three into the vena cava inferior, one into the lung, one into the colon, one into the pelvis of the kidney, one into the posterior mediastinum, one into the chest, two died suddenly, without rupture of the sac, two from jaundice, and nine of the following—heart disease, scarlatina, phthisis, diarrhœa, exhaustion, hydrothorax, anasarca and ascites, senile gangrene, and rupture of the sac by vomiting. The terminations of the remaining twelve cases are not given.

Treatment.—The remarks respecting the treatment of thoracic aneurism will apply equally to the abdominal. Mental and bodily quietude and attention to diet, are the chief circumstances to be attended to. Opium in large doses must be resorted to if the pain be severe, and the preparations of morphia will, I believe, be found to be most serviceable. An opiate or belladonna plaster to the back or loins, or the application of a small blister, the abraded surface being dressed with a small quantity of the hydrochlorate of morphia (as recommended in thoracic aneurism) will often afford relief. If the bowels be constipated, gentle aperients, either by the mouth or rectum, should be used. If the patient suffer much from flatulence, turpentine or assafoetida enemata will probably give temporary ease. The propriety of venesection, both in this and in thoracic aneurism, will depend much upon the state of the pulse; if the pulse be full, hard or wiry, I believe that benefit will generally arise from the abstraction of blood and the observance of a spare regimen.

CHAPTER X.

CEREBRAL ANEURISM.

THE cerebral arteries are more liable to aneurismal dilatation than other vessels of a similar size. The absence of a cellular sheath, the frequency of concussions of the skull, and the irregularities of the circulation in the brain, from mental and bodily excitement, will fully account for the greater prevalence of the disease in these arteries. Eight cases of cerebral aneurism are reported in the table, all occurring in males. Five were seated in the basilar, and three in the cerebral arteries: three were under twenty years of age, and the remaining five, between thirty-five and sixty: three of the patients were soldiers, one a shoemaker, another a porter, the sixth an innkeeper; the occupations of the two others are not named. The aneurisms varied in magnitude from a pea to a common-sized apple. Rupture of the sac and extravasation of blood took place in the three seated in the cerebral arteries: of those affected with basilar aneurisms; sanguineous apoplexy, cerebral congestion, encephalitis, hemiplegia, and pressure on the medulla oblongata were the causes of death.

The symptoms vary according to the situation and size of the tumour; if it be small it will occasion but little inconvenience; sometimes a fixed pain in the head is present, but the symptoms are not sufficiently characteristic to enable us to discriminate between this and other structural alterations within the skull. In the two following cases which came under my own observation, the cerebral arteries were not generally diseased; the first (530) occurred in a patient of my friend Mr. Beane of Peckham, who was absent from home at the time. I saw the boy during life with his assistant Mr. Foster, who assisted me at the post-mortem examination, and from whom I obtained the previous history of the case.

“June 20th, 1839. James W., æt. 14, who had generally enjoyed good health, was (whilst carrying a heavy weight) seized with a giddiness, and fell in a state of insensibility and remained so for ten minutes. On recovering, he could recollect nothing that had happened but the previous giddiness. He kept at home in consequence (as he said) of feeling a great weight in his head accompanied by giddiness, and extreme intolerance of light; being obliged to screen his eyes with his hands. This continued till the evening of July the 7th, when in the act of getting into bed he fell down suddenly. He was immediately placed in a warm bed, being extremely cold, particularly about the extremities, his pupils were dilated, his breathing stertorous, with occasional moans, he frequently scratched his head with his right hand (his left side, I may add, being paralysed).”

“*Treatment.*—Mustard cataplasms to the soles of the feet; a large blister to the nape of the neck; I endeavoured to administer two grains of calomel, but could not succeed. The following morning I found him in the same condition, but with considerable heat of skin; the blister had risen well; moaning less; having lost the power of expelling his urine, and the bladder being distended, his water was drawn off. I may mention that in consequence of increased arterial action (the carotids pulsating violently), ʒxvj of blood were taken from the arm. The subsequent morning I found him in nearly the same state, pulse being about 80, small and compressible; bladder distended; pupils immoveable, and not contracting on the approach of a lighted candle; the left eye natural; the right had a peculiar tremulous motion. His water was again drawn off; a turpentine enema was given, but without producing any effect. He died on the 11th at two o'clock.”

Examination, twenty hours after death.—The body rather thin. On opening the calvarium the vessels on the dura mater were seen filled with a dark coloured blood, as were those on the surface of the brain; there was no fluid between the membranes. On slicing the upper part of the hemispheres, several small bloody spots were observed; the left ventricle contained

about a teaspoonful of clotted blood, and the right a table-spoonful; the septum lucidum was broken down near its middle; in the right anterior lobe of the cerebrum was a cavity filled with blood; this communicated with the right ventricle: the sides of this cavity were soft and pulpy. I removed the right anterior cerebral artery, and on tracing one of its branches into the substance of the brain, to the lower part of the cavity, I found two small tumours connected with it; one white and about the size of a pea, and the other as large as a horsebean and of a dark colour; on cutting into the first, I found it composed of fibrinous layers, the latter contained a hard clot of blood. The extravasated blood had escaped from a rupture in the larger aneurism.

The above shows the importance of giving a guarded prognosis in all cases of injury to the head. The hemorrhage arose from the bursting of the larger aneurismal sac, connected with the anterior cerebral artery; this was probably formed at the time of the fall, in consequence of injury to the coats of the vessel. I think it scarcely likely (considering the boy's age) that arterial disease existed prior to the concussion. The ramollisement was, I believe, inflammatory. Dr. Bright (Hospital Reports) has recorded two examples of this condition of the artery (Cases 85 and 125), the first bears some analogy to the foregoing.

In the second case (Table 529) my patient died of apoplexy. I removed the vessels at the base of the brain, but did not discover the aneurismal dilatation till the next day, when I was making a careful examination of the arteries.

I think it very probable that many of these aneurisms have been overlooked in a similar manner; especially when they have been of a small size. The drawings in Plate IV, Figs 5-6, are good representations of these aneurisms which I have in my collection.

CHAPTER XI.

DISSECTING ANEURISM.

THIS form of aneurism which has only been described of late years,¹ consists in the rupture of the inner and middle coats of the artery, the blood dissecting these from the cellular, or splitting the layers of the middle coat, sometimes to a small extent, at others the blood passes for a considerable distance along the artery. Twenty-one² cases of dissecting aneurism are recorded in the Table ; fourteen of these occurred in females and seven in males.

Age.—One patient (214) was only twenty-four years of age ; but the coats were separated to a very small extent ; 3 were between twenty and thirty ; 2 between forty and fifty ; 3 between fifty and sixty ; 4 between sixty and seventy ; 3 between seventy and eighty ; and 1 was ninety years of age. Two are described as middle-aged ; and in 2 the age is not mentioned.

It will be seen from the foregoing remarks that this variety of aneurism is much more frequent in women than in men ; and that most of the patients are advanced in years. It is not difficult I think to understand why this form of the disease should occur more frequently in the aged, when we consider the state of the arterial tunics at this period of life, their connecting media from increased dryness being more readily destroyed. I have performed several experiments on the coats

¹ Laennec was the first who used the term “dissecting,” but cases are related by Morgagni and Allan Burns before his time. Dr. Peacock has published an excellent paper on this disease in the sixtieth volume of the Edinburgh Medical and Surgical Journal, which I had not read until the greater part of the above article was written.

² In addition to these cases, seven others are related by Morgagni, Allan Burns, Laennec, Tessier, Hodgson, Elliotson, and Guthrie. The ages of the patients 56, 59, 67, 70, 77, one is described as an old woman, and the age of another is not mentioned ; four of these were males, and three females.

of arteries of persons of different ages, which have fully confirmed this opinion. Thus, if a small syringe (Anel's) is filled with water, and its nozzle inserted into the layers of the fibrous coat, or between it and the cellular coat of an artery taken from an old subject, the fluid will be injected a considerable distance between the tunics. If, however, the experiment is tried on the artery of a young subject, considerable difficulty will be experienced in separating the lamina, and the water will only divide the coats to a small extent. I am, however, at a loss to account for the greater frequency of this disease in females, and I will not at present attempt an explanation. The lower part of the ascending aorta is the most common seat of these ruptures, and the blood is generally discharged into the pericardium. Thus, fifteen cases terminated in this manner; and four died of the following—senile gangrene, tuberculated lungs, dropsy, and orthopnoea; in two the cause of death is not given. This lesion is generally attended with acute pain, great collapse, sense of suffocation, and constriction of the chest; there are no positive signs, however, which can indicate its existence. In some cases, death takes place at the time of the rupture; in others the cellular coat of the aorta and its pericardial covering form a barrier for a few days to the passage of the blood into the pericardium; whilst in a third variety, a new channel is formed by the splitting of the coats; and in one instance (176) this channel appeared to be lined with false membrane, the patient living for a considerable time after the rupture. Seven of the patients died suddenly, seven lived from one to twelve days after the accident, another survived a month, another lived several months, and in a third the period is not named. The coats may be separated on one side of the artery only, or the splitting may extend to the whole circumference of the vessel. In some instances the blood, after dissecting the coats, again found its way into the artery; in two cases only did the rupture occur in the abdominal aorta, and in three others the blood passed along the coats of the thoracic to the abdominal aorta, being discharged above into the pericardium. From the experiments I have made, I am disposed to think that an artery containing a large quantity of bony and atheromatous matter, is not so likely to be affected with this form of aneu-

rism, as one which is nearly free from deposit, the adventitious substance tending rather to prevent the splitting of the coats. In Dr. Henderson's case (176), where the coats of the thoracic and abdominal aorta were separated to a considerable distance, the aorta was but slightly diseased. In Dr. M'Donald's patient (261), the aorta was healthy at the ruptured part, which was situated a little above the valves. The transverse and descending portions were much diseased.

The dry state of the arterial tunics in old persons, producing loss of cohesion, appears to be the chief predisposing cause of these ruptures, and the unyielding condition of the cellular coat in the aged, may be another reason for their more frequent occurrence at this time of life. If the rupture took place in a healthy artery, the result would probably be the formation of a false aneurism instead of the one in question.

I had several times seen the subject of the undermentioned case when in St. Thomas's Hospital.

B. A., aged 69, had been under the care of Mr. Mackmurdo for some time with melanosis of the eye. On Saturday, Oct. 24th, 1846, removal of the eye was proposed; but as there was some difference of opinion as to the propriety of the operation, it was deferred. The man had been in an anxious state of mind respecting the operation, and appeared to be relieved when he heard that it was not to be performed. He had generally enjoyed good health; but about eighteen months since, (notwithstanding his advanced age), he had a severe attack of hooping-cough. On the 25th, two a. m. (when in his usual state of health), he had occasion to go to the water-closet, and whilst there he called for assistance, being seized with violent pain in the cardiac region, attended with a sensation of faintness. He exclaimed, "I am a dead man!" and he gradually sunk in an hour and a half from the first appearance of the symptoms.

The brain normal. The pericardium was found filled with serum and coagulated blood. A transverse rent was observed in the aorta seated two inches and a half above the aortic valves, and the fibrous coat of the ascending aorta was separated from the

cellular coat as far as the arch, by coagulated blood ; the cellular coat of the branches from the arch highly injected with blood ; the coats of the ascending aorta very lacerable, so that they would tear with the greatest facility ; several atheromatous and bony patches under the serous membrane of the ascending aorta ; the blood had found its way into the pericardium by a small aperture which would scarcely admit a common-sized probe. I saw the above parts soon after their removal from the body ; but, unfortunately, a careful examination was not made of the descending thoracic and abdominal aorta.

CHAPTER XII.

EXTERNAL ANEURISMS.

I SHALL now proceed to describe separately those aneurisms which are within the reach of surgical treatment. I purpose first giving a description of the aneurisms affecting the different arteries, with such other remarks in relation to the subject as I may think of practical importance.

An account of the various methods of performing the operations for the ligature of arteries must increase this treatise to an unreasonable length, and such a description, after the works of Cooper, Scarpa, Hodgson, Velpeau, Liston, Porter, Guthrie, and others, would probably be considered tedious and uncalled for. I shall, therefore, content myself with making only such general remarks respecting the operations as I may think useful to the student and junior practitioner.

External aneurisms (as will be seen by the deductions at the commencement of this article) are not so frequent as those occurring in the chest and abdomen; and if our information were more accurate and extensive, we should probably find that the proportion of internal aneurisms would be much greater than is there stated. Aneurisms of the limbs are more readily detected, are generally subjected to surgical operation, and, therefore, likely to gain publicity; whilst those of the chest and abdomen often remain undiscovered, and if diagnosed, are frequently not reported.

In the late work of Mr. Erichsen, published by the Sydenham Society, so full an account of the history of aneurism is given, up to the commencement of the present century, that, even if my limits would admit of it, I could furnish but little additional information. I am, nevertheless, desirous of making a few observations respecting the great decrease of mortality from external aneurisms which has taken place since the introduction of the Hunterian operation.

In speaking of popliteal aneurism, Pott¹ remarks, "In what manner is this disease, when got to this point, to be treated? or how is the cure of it to be attempted? for, if something be not done, the limb will become mortified, and the patient will perish.

"If a man was to answer from theory, he would say that the skin is to be divided, the extravasated blood cleared away, and the artery to be tied above and below the dilatation; in short, that what is called the operation for the aneurism, is to be performed. Sorry am I to find myself obliged to say that, as far as my observation and experience go, such operation, however judiciously performed, will not be successful, that it will not save the patient's life.

"In both these aneurisms, the femoral and popliteal, it most frequently happens that the artery is not only dilated and burst, but it is also distempered some way above the dilatation, particularly in the popliteal. This may probably be one reason why the ligature is, in general, so unsuccessful."

Deschamps² says, "I can adduce in proof the assertion of one of our most celebrated surgeons, who lately said in public, whilst speaking of this operation, that if he had the misfortune to be affected with aneurism of the popliteal artery, he would rather have the thigh amputated than submit to it."

Sir Everard Home³ observes, "Experience has shown that all the modes hitherto practised are exceedingly precarious, being rarely attended with success, and the death of the patient being commonly a consequence of a failure of the operation; a circumstance which has led some surgeons of great eminence to prefer the amputation of the limb in all such cases."

Much discussion has arisen as to the comparative merits of Anel, Desault, and Hunter; and some English surgeons have perhaps been too lavish in their praises of their own country-

¹ Remarks on the Necessity and Propriety of the Operation of Amputation in certain Cases. By Percival Pott. London, 1779.

² Observations sur la Ligature des principales Artères, &c., 1793. Erichsen's Translation.

³ Trans. of a Society for the Improvement of Medical and Chirurgical Knowledge,

man, who, like most other discoverers, probably profited by the communications of his contemporaries and predecessors. Thus Leslie,¹ in 1774, in a case of traumatic aneurism of the lower part of the femoral artery, after securing the vessel above and below the wound (on the recurrence of hemorrhage), says, "I now resolved to take a fresh firm spot higher up, and, from the size of the aperture in the first operation, I had little more to cut. However, to make sure of it, I took up the vessel three inches at least above the former ligature." His patient recovered.

Hunter may have benefited by the labours of other surgeons, but I must express my belief, that to him the chief praise is due; and, to use the words of Sir Astley Cooper,² "That great surgeon has the undoubted merit of having substituted a simple and beautiful operation for one of very considerable difficulty and danger."

Diagnosis.—Although the diagnosis of external aneurisms is less difficult than of those seated in the aorta, numerous errors have been committed, and it has not unfrequently happened that a lancet has been plunged into one of these aneurismal swellings for supposed abscess. Many mistakes of this kind (7) are recorded in the Table. Ribes, in the 'Gazette Médicale,' 1835, Nos. 10 and 11, mentions ten cases of this description; and I have met with other instances amongst the older writers. These mistakes are now, however, of rare occurrence, as few surgeons of the present day would be found to use the lancet without first introducing an exploring needle, a proceeding unattended with subsequent mischief. In some instances the thrusting of a lancet into the aneurismal sac has been followed by fatal hemorrhage. I have, however, been surprised at the little inconvenience which has appeared in some cases to arise from this procedure.

Another very common error in the diagnosis of external aneurisms is, the mistaking tumours of various kinds for aneurismal dilatations. Thus Guthrie³ tied the common iliac artery for supposed aneurism of the external iliac: the patient

¹ Medical and Physical Commentaries. Edinburgh, 1774.

² Lectures, p. 156.

³ Diseases of the Arteries.

was seen by Sir Astley Cooper, Mr. Keate, Mr. Thomas, and other surgeons, who concurred with Mr. Guthrie in opinion. The lady died nine months after, and the swelling proved to be a malignant tumour.

Mr. Earle¹ tied the subclavian artery under the belief that the patient suffered from aneurism of this vessel, and it was reported as the first successful case which had occurred in St. Bartholomew's Hospital. The man died five years after the operation, and an oblong tumour, full two inches in length and an inch and half in width, was found under the clavicle, the artery being firmly united to one side of it.

Mr. Eccles² tied the carotid artery for supposed aneurism, but on the death of the man, four months after, of bronchitis, the enlargement was found to have arisen from a glandular tumour.

Mr. Macmanus, at the Jervis-street Hospital, Dublin, ligatured the artery in a similar case. The patient died of diarrhœa on the ninth day, and the enlargement proved to be a carcinomatous tumour.

Dr. Nichol,³ of Inverness, tied the subclavian for supposed aneurism of the upper part of the arm. Death took place on the twenty-fifth day from hemorrhage and diarrhœa, and the disease was found to be medullary sarcoma.

Laennec⁴ mistook an encephaloid tumour, at the upper part of the sternum for aneurism.

Mr. Lawrence⁵ tied the femoral artery for what he considered popliteal aneurism; the man died, and the tumour was found to be osseous.

Mr. Stanley,⁶ at St. Bartholomew's Hospital, recently tied the common iliac for supposed aneurism of the external iliac; the man died three days after the operation, of peritonitis; the tumour was discovered to be of a spongy structure, and attached to the left ilium.

Mr. Baker,⁷ of Newcastle, tied the subclavian in a girl 18 years of age, for a tumour of the axilla, which he supposed

¹ Medical Gazette, vol. xvi.

² Lancet, 1844.

³ Edinburgh Medical and Surgical Journal, xlii.

⁴ Gazette Méd.

⁵ Medico-Chirurgical Transactions, vol. xxviii.

⁶ Ibid.

⁷ Lancet, vol. ii, p. 210. 1828, 1829.

was aneurismal; it turned out to be fungus hæmatodes. The case terminated fatally.

Several examples of a like kind may be found on referring to cases of pulsatile tumours in bones.

I have mentioned the above for the purpose of showing that the best surgeons may be deceived in their diagnosis.

External aneurisms are not so large as those of the aorta; the comparative size of this vessel, and the yielding nature of the parts around will readily account for the difference. If the history and symptoms of external aneurisms are carefully investigated, it will be found that in the very great majority of cases the aneurism may be traced to muscular exertion or external violence; and the commencement of the disease is often recognized by the patient—a sudden snap or some peculiar sensation at the moment of exertion leading him to direct his attention to the part. The tumour is, at first, small and sometimes pulsating, and increases with greater or less rapidity according to the situation of the aneurism, and the resistance afforded by surrounding structures.

The form of the tumour is globular or oblong, it afterwards becomes more irregular: pulsation is generally present, and on the application of the ear or stethoscope a bellows-sound is heard. This sound was recognized by many of the older writers. Ambrose Paré,¹ 1628, in speaking of the signs of aneurism, mentions the bellows-sound “un bruit ou soufflement;” and Petit,² in 1736, alludes to the same noise.

Mr. Guthrie³ remarks that “the application of the ear to a swelling in the situation of an aneurism is indispensable, and it will be found, I do not hesitate to say, decisive in most instances, even of a very doubtful character.”

Mr. Earle, in speaking of the case before alluded to, says, “It furnishes the principal negative evidence in favour of auscultation, as the usual sound of aneurism was absent.

It is said by most writers on aneurism that bellows-sound may be produced by the pressure of a tumour upon an artery.

¹ Les Œuvres d'Ambrose Paré, p. 234. 1628.

² Mémoires de l'Académie Royale des Sciences Méd., p. 244.

³ Medical Gazette, 1831.

I have seen several cases where tumours have been in contact with the larger arteries, but this sound has never been present, and I apprehend that it can rarely be produced by this cause; the arterial tunics being so yielding and elastic that the diameter of the tube could scarcely be diminished by this kind of pressure. I recollect a very interesting case of aneurism of the posterior tibial artery (Table 520), which was under the care of Mr. Tyrrell,¹ in St. Thomas's Hospital. The patient was a girl only 20 years of age; she had a pulsating tumour in the lower part of the ham, about the size of a small orange; the pulsation was rather feeble, but *a distinct bellows-sound was heard over the swelling*. Mr. Tyrrell, in spite of the opposition of both his colleagues (who thought that it was an enlarged bursa in contact with the vessel) tied the femoral artery, and the girl perfectly recovered. The age and sex of the patient had probably much effect in influencing the opinion of Mr. Tyrrell's colleagues.

Although bellows-sound is generally present in external aneurisms, there are many recorded cases where no abnormal bruit has been detected. If the aneurism be large and full of coagulum, or if very small, this sound will, probably, not be discovered; in large diffused aneurisms it may also be absent.

The preceding remarks are intended to apply to the generality of external aneurisms: I shall notice the signs peculiar to each hereafter.

Aneurismal diathesis.—Much has been said by some writers on the aneurismal diathesis; but I believe this predisposition to the disease to be of rare occurrence.

Mr. Tyrrell² saw seven aneurisms in one individual; Pelletan³ saw sixty-three in the same patient; and Cloquet⁴ met with aneurismal dilatations in nearly all the arteries. These cases, which are rare exceptions to the general rule, have been so frequently quoted that they have led several, who have not taken the trouble to investigate for themselves, to form very erroneous opinions.

On referring to the Table, it will be seen that the disease seldom occupies more than one artery, and in the instances of

¹ Sir Astley Cooper's Lectures.

² Ibid.

³ Clin. Chirg. vol. ii.

⁴ Pathol. Chirg.

aneurism of both popliteal arteries, the occupations of the individuals are fully sufficient to account for the circumstance.

M. Bizot¹ attaches much importance to what he calls the symmetry of lesions, that is, the tendency of both sides of the body to be affected in the same manner; and he thinks that this law of morbid anatomy applies particularly to the arteries. I question whether this opinion of M. Bizot will bear the test of accurate pathological research, either as regards the arteries or other parts of the body. It cannot be denied that double organs, whose functions are similar, are often affected with the same disease, especially if it be produced by a constitutional taint; but they are not disorganized to the same extent, and I could adduce numerous instances where this correspondence does not exist. Take for example the diseases of the brain, testicles, and ovaries. If this symmetry of lesions were as frequent as M. Bizot supposes, that beautiful provision of nature, the supply of double organs, would, in a great measure, be frustrated. I have not been able to satisfy myself that the liability to aneurism is increased by hereditary predisposition, although I think it not improbable that the tendency to the disease may be transmitted from parent to offspring.

Mr. B. Cooper operated upon two brothers for popliteal aneurism, but there was no evidence to show that they inherited the complaint from their parents.

Patients affected with external aneurism will sometimes continue their occupations for a long period, and frequently up to within a short time of the operation. Mr. Syme² operated upon a major of dragoons, who had unquestionably laboured for many months under aneurism in the ham without being aware of it, and who actually followed the hounds with unabated energy the very day before the existence of a large pulsating tumour was ascertained.

Termination of external aneurisms.—If an external aneurism be left to itself it will, in the generality of cases (like internal

¹ Before cited.

² Edinburgh Monthly Journal, vol ii.

aneurism), gradually enlarge, and ultimately burst. Such a termination is now rarely met with; but if we refer to the works of the older surgeons we shall find numerous cases of this description, and several which have terminated favorably without the aid of the ligature.

There is scarcely a well-authenticated case¹ of the spontaneous cure of internal aneurism on record; but I find a great number of instances of external aneurisms which have had a favorable issue; and it is not unlikely that if many aneurismal swellings of the limbs were left entirely to nature, that she would effect a cure. It is far from my wish to undervalue the resources of our art in this dangerous disease, but the *vis medicatrix nature* is too often lost sight of both in this and other maladies; and although this complaint especially requires the speedy aid of the surgeon, it is consolatory to know that it may occasionally have a happy termination without his assistance.

The spontaneous cure of aneurism may be effected, first, by the pressure of the sac upon the artery; secondly, by inflammation and deposit of lymph on the cardiac side of the vessel; thirdly, by the distension of the sac with coagulated blood; and, fourthly, by sloughing of the sac and profuse hemorrhage, so as to produce syncope and coagulation of the blood in the artery.

A beautiful example of the first mode of cure is in the Museum of St. Thomas's Hospital.

A man² who had laboured under an aneurism of the groin, of large size, whilst sitting by the fire in one of the wards of Guy's Hospital, felt something suddenly give way in the thigh; the limb became swollen and painful; and after four days the pulsation ceased and never returned. He died a year afterwards from the rupture of an internal aneurism. The aneurism of the thigh had burst under the fascia lata, and the accumulated blood pressed the aneurism on the femoral

¹ The only specimen I have met with of the spontaneous cure of aneurism of the thoracic aorta is in the Chatham Museum. Unfortunately nothing is known of the history of the patient.

² Museum Catalogue, vol. ii, p. 47.

artery so as to interrupt the circulation. Both the iliac and upper part of the femoral artery were obliterated.

Another specimen of the third variety may be seen in the same museum.

In addition to the eight cases (6, 17, 75, 162, 301, 400, 466, 506) of spontaneous cure of external aneurisms in the Table, several have been recorded by the older writers, and others have been published of a more recent date.

Dr. Bailie met with the spontaneous cure of aneurism of the carotid by coagulation of the blood in the sac.

Mr. Porter¹ says "a man had an aneurismal tumour over the left clavicle, generally supposed to have been connected with the subclavian artery: various consultations were held upon the case, and operation was determined on, when it was observed that the force of pulsation had somewhat diminished. I know not but that gentle compression might have been attempted, but the position of the tumour was so unfavorable that such treatment could have had no very decided influence on the disease; nevertheless, from day to day the violence of the pulsation subsided, the size of the tumour diminished, and he left the hospital well."

Mr. Luke has recently published in the 'Medical Gazette' an interesting case of the spontaneous cure of aneurism of the femoral artery.

Pressure.—This mode of treatment is now becoming so frequent in aneurisms of the femoral artery, and the cases in which it has been recently employed have been so successful that there is great probability that the use of the ligature, in the cure of popliteal and femoral aneurisms, will hereafter seldom be resorted to.

When writing on this subject in 1844, I expressed my belief that pressure might be more frequently adopted. At that time I was acquainted with only six (recent) successful cases; but at the present moment the Table comprises twenty-

¹ Before cited, p. 76.

one (55, 69, 239, 240, 241, 256, 257, 262, 277, 330, 369, 375, 496, 511, 512, 515, 526, 546, 547, 550, 551); others have been treated successfully by Messrs. Todd, Molloy, Duggan, Cusac, Crampton, Harrison, Dartnell, Armstrong, and O'Ferrall.

It is not to be wondered at, that the older surgeons who found the operations then resorted to for the cure of aneurism so unsuccessful, should have tried compression for that purpose. Guattani¹ used it in fifteen cases, and four of his patients were cured.

The pressure was applied principally upon the aneurismal swelling, and no attempt was made to obliterate the artery at some distance above the tumour. It is remarkable I think, considering the success which Guattani met with, that this mode of treatment was so soon abandoned; and it is still more astonishing that it had not a more extended trial, after the superiority of Hunter's operation became so generally acknowledged.

Sabatier² cured a femoral aneurism by methodical compression.

Dubois³ (1810) dispersed a femoral aneurism by steady pressure upon the vessel by means of Dupuytren's compressor.

Mr. Freer⁴ thought that the cure of aneurism should be attempted in the first instance by pressure, before the performance of the operation.

Mr. Todd, of Dublin, in 1820, applied pressure in two cases of popliteal aneurism, but was afterwards obliged to resort to the ligature; in a third case (1825) he effected a cure.

Mr. Cusac, in 1826, used pressure unsuccessfully.

Sir Philip Crampton, in 1830, cured a popliteal aneurism by this means.

Mr. White, at the Westminster Hospital, in a female affected with popliteal aneurism, used pressure for five days with a newly-invented spring-truss; deep sloughing of the

¹ De Externis Aneurysmatibus, &c., 1772.

² Pelletan, Clin. Chirurg. 1810, vol. i, p. 149.

³ Dict. de Méd. et Chirurg. Prat., vol. xi.

⁴ Observations on Aneurism, 1817.

thigh took place, and the woman, after much suffering, recovered.

Mr. Lynn, at the same hospital (1832), was successful in another instance (Table 330), and as this case has not been quoted by those who have recently written upon the subject, I shall make no apology for inserting the subjoined account which Mr. Hancock (Mr. Lynn's dresser at the time) has kindly furnished me with. "The patient was a man about 34 or 35 years of age, a gardener by trade, and the disease occurred in the left leg; he was bled once, pretty freely upon his admission; he was also purged and placed upon low diet; small quantities of blood were also abstracted from time to time, during the period of treatment, which lasted (as nearly as I can now recollect) about six weeks; a bandage and pad were placed around the knee, and the common strap tourniquet upon the pad; the latter being screwed as tightly as the patient would bear it; and the tourniquet was also applied higher up, about the lower third of the thigh, and kept but moderately tight; his leg was also bandaged from the toes up to his knee; he suffered so much pain that he was continually removing the tourniquet, and it was with the greatest difficulty he could be prevailed upon to persevere in the treatment; he was, however, completely cured."

In the '*Gazette Médicale de Paris*,' 1837, two examples of the cure of crural aneurisms, by the application of ice and pressure, are reported. The first (p. 313) was treated by M. Faulcon, of Vienna. The patient was thought to be labouring under an aneurismal diathesis, produced by hypertrophy of the heart, and hence the ligature was not resorted to. Pressure was applied to the abdominal aorta, ice and leeches to the tumour, bleedings from the arm, digitalis internally with a milk diet. No apparent benefit was derived from this treatment at first, but pulsation suddenly disappeared, and the tumour decreased in volume.

In the second case, treated by M. Reynaud, of Toulon, (p. 565), the aneurism was large, and supposed to occupy the common, external iliac, and femoral arteries. Valsalva's treatment had been tried without any perceptible benefit, and the

man was admitted into the hospital on the 1st of February, 1834. He was put upon a low diet, and a bladder of ice was constantly applied to the tumour. In November the tumour had considerably diminished in size, and pulsation had ceased; the limb was now bandaged, and the application of the ice continued. This treatment was persevered in until February, 1836, when the patient left the hospital cured.

Although several cures had been effected by this mode of treatment, the pain attending the process, the difficulty of persuading patients to submit to it, and perhaps the prejudice that most surgeons entertained in favour of the ligature, may account for the tardiness of its general adoption; the instruments used, moreover, were mostly clumsy and inefficient.

Sir Astley Cooper and the majority of modern surgeons were opposed to the treatment by compression.

Mr. Guthrie,¹ in speaking of Mr. White's patient, says, "I watched the progress of the case with great attention, and will not be easily induced to use that or any other instrument for such a purpose."

Mr. S. Cooper² remarks, "Few patients indeed can endure the pressure of such instruments a quarter of this time, when they are put on sufficiently tight to afford any chance of obliterating the artery; and on account of the suffering which they produce they are rarely used by modern surgeons."

Richerand, in the 'Dict. des Sciences Méd.' 1812, says, "Compression, like the debilitating method in the greater number of cases, is only applicable in the first stage of the malady to favor the passage of the blood by the collateral branches."

Chomel, in the 'Dict. de Médecine,' 1821, remarks, "Compression has been employed very often in the treatment of aneurism, and when properly applied, and in suitable cases, it never produces an unfavorable result; and when it does not effect a cure, it leaves the patient in a better condition for the ligature."

¹ Above cited, p. 142.

² Surgical Dictionary, 1838, p. 126.

Bégin, in the 'Dict. de Méd. et Chirurg. Prat.' 1829, after speaking of pressure, says, "It results from the preceding observations that these various plans for the treatment of aneurism offer nothing but uncertainty and inconvenience, and afford but slight probabilities of success."

We have already evidence enough to show that the one operation is attended with little, if any danger; whilst in the other, at least one tenth of the patients lose their lives.¹

The use of pressure in the treatment of traumatic aneurisms, particularly when seated in the brachial artery, has been too much neglected. I have recently seen two patients who have been operated upon for traumatic aneurisms of the brachial artery near its bifurcation; in both instances the operation of opening the sac, and tying both ends of the artery was performed. The patients did well.

This operation, however, although more successful than any other connected with aneurism, has often terminated fatally; and it becomes an important question whether the brachial artery should be tied without first trying the effect of pressure, a means which, if properly used, will, I believe, obviate the necessity for the ligature.

There is a preparation in the St. Thomas's Museum (595), taken from a man whose brachial artery was tied for traumatic aneurism. The patient died eight days after the operation.

In addition to the above, I could enumerate other examples in which this operation has been attended with an unfavorable result.

The late Mr. Tyrrell, at St. Thomas's Hospital, treated five cases of traumatic aneurism at the bend of the arm, by bandaging the whole arm, commencing at the fingers, and placing a compress over the tumour, making pressure on the brachial artery by means of a ring tourniquet, the arm being kept straight and the hand well up. In all the patients a cure was effected.

¹ This calculation is not made from the Table, where the mortality is about one ninth, but I have reason to believe that the operation for popliteal aneurism has of late years been more successful.

Mr. Cusac,¹ 1828-29, cured two cases by means of pressure with a compress and roller, blood being abstracted and digitalis administered. In a third case the aneurism (which was as large as an orange), after the use of pressure, became diffused. The artery was tied, and the patient did well.

The undermentioned case is a good example of the effect of pressure on the brachial artery, and serves to show that obliteration of this vessel may be readily effected.

A child, 12 years old, was admitted into the Hôtel-Dieu for fractured clavicle, and treated by means of a cushion in the axilla (Desault's plan). He complained of pain in the inner part of the arm, but the bandages were not removed until the 13th day, when the fracture was consolidated; but there was an eschar formed by the pressure of the cushion, and it was found that the brachial artery was obliterated; no pulsation being perceived below the eschar. The heat and sensibility of the limb were preserved, but there was great numbness of the arm. However, some days afterwards pulsation appeared in the radial, and the boy left the hospital cured.²

Mr. Syme, of Edinburgh, has been one of the most strenuous of the modern objectors to this mode of treatment; but I think the evidence in favour of the plan is now so abundant and satisfactory that Mr. Syme will be induced to change his opinion. It is quite true that sufficient time has not elapsed to enable us to judge of the success of the recent cases; but I apprehend that little is to be feared on this score, as the cases of permanent cure are at present sufficiently numerous to warrant the assumption that the disease is not likely to reappear. In Cases 376 and 377 pressure was tried (in the last for six months), the aneurisms were thought to have been cured, but pulsation returned, and the ligature was successfully applied. I have reason, however, to believe that in these cases (and the same remark will probably apply to the

¹ Dublin Journal, vol. i, p. 117.

² Archiv. Gén. de Méd., 1836, p. 382.

generality of the unsuccessful ones) the pressure was not so well adjusted as in those of a more recent date.

A case of femoral aneurism has lately come to my knowledge, which was treated by pressure for several weeks, and with every chance of ultimate success; the patient, however, contrary to the advice of his surgical attendants, had the artery ligatured, and he died of secondary hemorrhage.

In the following case (which I have frequently seen) pressure can scarcely be said to have had a fair trial.

Nov. 28th, 1846. A. B., æt. 36, a bricklayer's labourer, was admitted yesterday into Guy's Hospital, under the care of Mr. Key, for popliteal aneurism in the left ham; his habits have been intemperate; he never took mercury, nor had the venereal disease; he has been accustomed to carry heavy loads of bricks up a ladder; his general health has been good, and he is a strong muscular man. About six weeks since he first observed a slight stiffness in the left ham, this was followed by a pulsating tumour, which is now of a rounded form, and as large as a common-sized orange; the parietes of the sac are thin, and a distinct bellows-sound is heard on the application of the ear. On his admission, the swelling was very painful, and eight ounces of blood were taken from his arm, with great relief to the pain. A bandage was applied with two tourniquets, one on the groin, and the other on the middle of the thigh, but they did not well command the artery; other instruments were used, but as they did not appear to answer the purpose, Mr. Key (fearing that the sac would burst) tied the femoral artery December 15th. The patient (Jan. 19th) is doing well.

It is chiefly to the Dublin surgeons that we are indebted for the revival and successful application of this means of cure. Mr. Hutton (Table 239) cured a patient of popliteal aneurism in 1842 by pressure, and since this period the successful cases have gradually increased.

I have no doubt but that this method of treating aneurisms of the femoral and brachial arteries will, after a few years, be universally adopted, and a surgeon will not consider himself

justified in using the knife until pressure has had a fair trial. The danger attending this mode of treatment is so slight that I am not aware of a recent instance in which any untoward symptoms have occurred. In Mr. White's patient sloughing took place to a great extent, but this arose probably from the instrument being too tightly applied. Another powerful argument, I think, in favour of pressure is, that the patient, in the event of its not proving successful, is in a better condition for the ligature in consequence of the enlargement of the anastomosing branches. In patients who are supposed to labour under aortic aneurism, organic disease of the kidneys, or other organs, the method by compression is the only one that can be resorted to with any probability of success. The opponents of this plan have dwelt much on the tediousness of the process, and the great amount of pain which the patients generally endure, as compared with the Hunterian operation; but these are considerations which, I think, should not enter into the calculation, when the life of the patient is at stake.

The treatment by compression is probably not likely to offer much chance of success in aneurism of the iliacs, or the branches from the arch of the aorta; although in aneurism at the groin, when the tumour is so large as to preclude the application of the ligature, or when the patient refuses to submit to the operation, it is worthy of a trial, and, I think, holds out a better prospect of cure than Brasdor's operation. I would advise the application of Signoroni's tourniquet to the lower part of the artery; in addition to which, gentle and gradually increased pressure may be used upon the tumour by means of the elastic wire truss. I am not aware that this plan of making pressure upon the artery and aneurismal sac at the same time, has ever been tried in these cases, although aneurisms at the groin have occasionally been cured by pressure upon the tumour alone.

Various instruments have been used for the purpose of obliterating the artery. Morell, Hunter, Sennfio, Dupuytren, Oke, Liston, Allen, Hutton, Signoroni, and others, have invented compressors, or modified those in use.

The great objection to these instruments appears to me to be the difficulty of keeping them in proper apposition ; the inclusion, in consequence of the size of the compressor, of the vein and nerve, and the want of support they afford to the opposite side of the limb. The apparatus described in the Appendix, I believe, will be found to answer the purpose better than those now employed, although at present I have not had an opportunity of trying it. Attention to the position¹ of the limb will probably tend greatly to facilitate the cure ; thus, in brachial aneurism, the arm might be kept nearly in the perpendicular direction, and in femoral aneurism the foot much elevated.

M. Petrequin,² of Lyons, has lately recommended galvano-puncture for the cure of external aneurism, the effect being the production of inflammation of the sac and the coagulation of the blood. This plan was first tried in an aneurism of the temporal artery with success ; and M. Petrequin alludes to two cases of popliteal aneurism (spontaneous) and two of traumatic aneurism of the brachial artery, in which this mode of treatment was attended with success. Sufficient time, however, has not elapsed to enable us to judge of the efficacy of this method ; but I confess that I am not inclined to believe that it will be found to answer the expectations formed of it by M. Petrequin.

When the cure of external aneurism cannot be accomplished by the above means, a ligature must be applied to the artery.

A surgeon would scarcely attempt the performance of this or any other operation without first making himself well acquainted with the anatomy of the parts concerned, and this knowledge is especially necessary when operating upon the larger blood-vessels. The relative position of the nerves, veins, arteries, and other structures to the artery to be ligatured, must be well considered ; and the operator, moreover, must be

¹ Dr. O'Ferrall, of Dublin, has recommended this plan in the last number of the Dublin Journal, Nov. 1846 (since the above was written).

² Sur une Nouvelle Méthode pour guérir certains anévrismes sans opération sanglante à l'aide de la Galvano-Puncture.

prepared to meet any untoward circumstances that may occur ; such as the anomalous distribution of the vessels, disease of their coats, unusual position, and preternatural adhesions of the veins, &c.

A correct knowledge of the structure and relative position of the blood-vessels can only be obtained by frequent and careful dissection ; and although a man might perform many of the minor operations of surgery without this information, he would scarcely venture to apply a ligature to a large blood-vessel unless he possessed an accurate acquaintance with the anatomy of the artery to be operated upon. It must also be borne in mind that although this knowledge of the anatomical bearings of the different arteries is essential to the successful performance of the various operations for the cure of aneurisms and wounded blood-vessels, that operations practised on the dead body will give but a very imperfect notion of the difficulties and dangers which may arise when cutting into living structures. The pulsatory motion of the artery, the blood thrown from its extremity, and the scream of the patient when a nerve is included in the ligature, are, however, guides and warnings which we do not meet with when operating upon the dead subject.

Before the operation is undertaken the condition of the patient must be well considered, and the state of the internal organs carefully investigated. The thoracic and abdominal aorta will especially demand the attention of the surgeon ; and the larger arteries of the extremities must not be overlooked, as it has not unfrequently happened that an aneurismal swelling has been found in the opposite limb. The lungs are seldom tuberculous in those affected with aneurism ; and I have scarcely met with a death recorded from this cause after the operation. Tubercles were present in the lungs of four patients who died of internal aneurisms (209, 217, 271, 494). Heart affection in the young is also uncommon, but when the disease occurs at a more advanced period of life, this complication is more frequent. The state of the kidneys has been too much neglected before the performance of this and other operations. I have lately operated upon a woman for strangulated femoral hernia, she bore the operation remarkably

well, but sunk a few hours after without any apparent cause. On inspection after death I found both kidneys granular, but no trace of inflammation was present in the abdomen. I have recently seen another death after the operation for strangulated hernia from the same cause. I saw Mr. B. Cooper (Case 453) tie the external iliac artery in a man 51 years of age. He appeared to be doing well for a few days, but the sac remained as large as before the operation. He gradually sunk, some hemorrhage took place from the wound, but not sufficient to account for death. Both kidneys were granular. Although this condition of the kidney would not prevent the performance of the operation in hernia, nor, probably, in all cases of aneurism, yet the knowledge of the lesion must have an important influence upon our diagnosis.

It is often a nice point to decide what amount of disease should preclude the performance of the operation for aneurism. I think that many surgeons have been too careful on this point, and it is questionable whether a suspected aortic aneurism should debar the use of the knife (I speak of instances where pressure cannot be resorted to with any chance of success). Several cases are recorded where persons with aneurism of the thoracic aorta have lived a long period after the operation. In Case 462, Professor Hamilton, of Edinburgh, refused to sanction the operation for popliteal aneurism in a woman seven months gone with child. She died from the bursting of the sac ten days after delivery.

It is desirable to avoid operating upon patients who have lately undergone mercurial salivation. Some difference of opinion has existed among surgeons as to the period when a ligature should be applied, some recommending its early application, whilst others advise that the operation should be delayed until the collateral branches are sufficiently enlarged to carry on the circulation. I believe the majority of surgeons are now agreed as to the advantage of the early application of the ligature; and I am convinced from the perusal of a great many cases, that the fears entertained by some respecting the collateral circulation are groundless. The injury done to the surrounding structures by the enlargement of the sac, and the possibility of the aneurism becoming diffused are occurrences

much more likely to lead to disastrous results, than the mischief to be apprehended from a deficient supply of blood.

The chief points to be attended to during the operation are—First, the proper position of the patient, and the admission of light. Secondly, to make the integumental incision large enough to allow of sufficient room for securing the artery, and to detach as little of the surrounding cellular tissue as possible. Thirdly, not to include a nerve or vein in the ligature, nor to mistake either of these for the artery. Fourthly, to avoid injury to the vein whilst passing the aneurismal needle under the artery (279). Fifthly, when the sac (as in some cases of aneurism of the subclavian and innominate) is situated near the seat of ligature, to take care not to introduce the point of the needle into its cavity (79, 210). Sixthly, to avoid the division of the collateral branches.

The most likely accident to occur after the operation is secondary hemorrhage, and this generally takes place before or at the time of the separation of the ligature; it may, however, occur several weeks after the artery has been tied, but the most usual period is between the seventh and fifteenth days. Morbid changes in the thoracic and abdominal viscera producing an altered state of the blood; the age of the patient, the condition of the arterial walls; and certain constitutional peculiarities, have much to do with the production of secondary hemorrhage. Some patients sink after the loss of small quantities of blood, whilst in other cases, hemorrhage, to an enormous extent, may take place without fatal consequences. In Case 354 the patient lost one hundred ounces of blood, and did well.

Lisfranc¹ says, "I have collected 180 operations for aneurism performed according to Anel's method (Hunter's), and I find 32 cases of hemorrhage; that is to say, one in six, a proportion truly frightful. The bleeding has occurred generally from the sixth to the twenty-fourth day; the earliest on the first day, the latest on the sixtieth."

¹ Des Diverses Méthodes et des Différens Procédés pour l'Oblitération des Artères dans le Traitement des Anévrismes, par J. Lisfranc, 1834, p. 69.

Porta,¹ in his recent work on the 'Ligature of Arteries,' remarks, "It is the commonly received opinion that the usual period for secondary hemorrhage is at the time of separation of the ligature, from the tenth to the twenty-fifth day, which is to be understood to be the latest period." Experience has proved that there is no fixed time for this detachment, and no final security against hemorrhage until the wound has healed. He quotes eleven cases in which bleeding occurred from the second to the fifty-fifth day. Porta² further adds, "Of 600 cases (selected from various countries) of ligature of the carotid, subclavian, brachial, iliac, and femoral arteries, including the aorta and innominata, secondary hemorrhage occurred in 75 cases. Thirty-one of the patients were cured, 30 died from loss of blood, and 14 from other accidents. In 31 cases the means resorted to were the following: the plug was used in 13, torsion in 4, a second or third ligature in 9, bandaging and cold applications in 3, and amputation of the limb in 2. The general mortality was 27 and a fraction per cent.; the mortality in the hemorrhagic cases 55 per cent.; but of these only $37\frac{1}{2}$ per cent. died solely from the bleeding."³ It will be seen that Porta's fatal hemorrhagic cases amount but to a twentieth, Lisfranc's to a sixth; and although Porta,⁴ when commenting on Lisfranc's statement, says that "he (Porta) has rejected all doubtful cases." Yet it must be remembered that the former speaks of the ligature of arteries in general, and the latter only of ligature for aneurism.

Of the 256 cases of ligature of the larger arteries for aneurism, recorded in the annexed Table, twenty-one patients died from hemorrhage, and eight terminations were of a doubtful character; thus the deaths are reported to have arisen from exhaustion, irritation, shock of the operation, &c.; but bleeding to a certain extent had taken place, and, therefore, had some influence in producing the fatal result. The deaths solely from hemorrhage amounted to rather more than one twelfth, and including the doubtful cases, to barely a ninth, whilst the general mortality is 22 per cent.

¹ Delle Alterazioni patologiche delle Arterie per la Ligatura e la Torsione esperienze ed osservazioni di Luigi Porta, 1845, p. 126.

² Ibid. p. 136.

³ Ibid. p. 404.

⁴ Ibid. p. 126.

It must be borne in mind that these operations were all for the cure of spontaneous aneurisms, and that the distal operation, ligature of the aorta and innominata, as well as of the subclavian on the anterior side of the scalenus are included. If these cases were omitted the rate of mortality would be considerably diminished. The 21 deaths from hemorrhage occurred at the following periods—6th, 8th, 10th, 11th, 11th, 12th, 13th, 13th, 15th, 18th, 20th, 21st, 26th, 36th, 38th, and 40th days. Two patients died two months after the operation; another ten weeks after, and in two cases the time is not named.

Treatment.—Pressure by means of a tourniquet, or compress and roller well applied, will often stop the bleeding. Many examples of the success of this treatment are recorded. Mr. Guthrie¹ says, “Many secondary hemorrhages may be restrained and ultimately suppressed by moderate pressure; and the ligature should only be had recourse to when the application of pressure appears to be, or has been, proved to be insufficient for the purpose.”

In some cases it is necessary to tie the vessel higher up; and of these many have had a successful termination. Should this plan not succeed, recourse must be had to pressure on the mouth of the vessel by plugging with sponge, German tinder, &c. Pressure, if practicable, should also be made upon the artery above.

Gangrene of the part below the ligature is a disease which has frequently occurred in the lower extremity (42, 126, 139, 144, 194, 225, 301, 313, 402, 403, 503, 519.) Four of these patients recovered and eight died; their ages were as follow: 48, 40, 31, 29, 28, 72, 46, 53, 27, 34, and the ages of two are not named. This disease is rarely met with in the upper extremity even in the aged; only two examples are related in the Table (76, 108), and these are described as cases of approaching mortification.

I believe that it generally arises from inflammation of the vessel below the ligature, and it is doubtful whether the mere

¹ Before cited, p. 166.

obstruction to the passage of the blood in the main artery, without the closure of some of the collateral branches by inflammation, would of itself be sufficient to produce the gangrene.

Although it is desirable to keep up the temperature of the limb (which is generally lower immediately after the ligature of the artery), I believe that the stimulating system has, in many instances, been carried too far, and that injurious consequences have resulted from it. The observations of Burns¹ upon this subject are highly important. "The gangrene does not arise from deficient circulation, and is generally if not always preceded by heat. We have as much to dread from over-excitement as from want of blood; the latter only in old subjects, such as no surgeon should operate upon. I may add I have never seen any treatment arrest the disease." The danger in these cases nevertheless is not so great as Burns would lead us to suppose. I have seen two cases in which amputation has been successfully resorted to, and others are related in the Table (42, 126, 403, 519). I saw Mr. B. Cooper tie the external iliac in May 1844, at Guy's Hospital, in a man æt. 42. On the day after the operation gangrene took place in the foot and leg. Amputation was performed and the man recovered. I witnessed another successful case in the practice of Mr. Green at St. Thomas's Hospital.

The best means then of preventing the occurrence of gangrene, are attention to the position and temperature of the limb, avoiding the over-stimulating plan of treatment, both externally and internally, and regarding the previous habits of the patient—a point in this and most other operations which I think is often not sufficiently attended to. From the want of this precaution Mr. Allen thought that he lost a patient (Case 160) after ligature of the external iliac.

Return of pulsation in the sac after the operation has occurred in a few cases (9, 71, 125, 304, 355, 471, 521), and has arisen probably from the blood finding its way into the sac through other channels than the main trunk. Thus it has happened in high division of the femoral (71, 471), and

¹ Above cited.

also where a large branch communicated with the artery or sac below the ligature. In many cases pulsation has existed for a few days and afterwards disappeared spontaneously, or by pressure. Case 125 is a good example of the benefit likely to be derived from methodical bandaging in these instances. In the Museum of St. George's Hospital I have examined an interesting preparation of popliteal aneurism operated upon by Sir B. Brodie¹ (May 1839), in which pulsation ceased in the tumour after the operation; it reappeared in six months, disappeared for some time, and returned again. "For twelve months the tumour gradually increased, and became as large as an ostrich's egg; it was solid, and no sound nor pulsation could be detected in it. For a time it remained stationary; but a few months before the man's death (which occurred from phthisis in July 1843) the tumour decreased in size. The swelling, which was the size of the head of a full grown foetus, presented the characteristic layers of coagulated blood observed in aneurisms which have been cured. After the tumour began to increase several experienced surgeons supposed it to be of malignant growth."

Other untoward events, such as phlebitis, inflammation, supuration of the sac, tetanus, apoplexy, convulsions, inflammation of internal organs, may happen after the operation, but these are comparatively of unfrequent occurrence.

Ligature.—Although we may justly claim for our countryman Hunter the merit of having perfected the operation for the cure of aneurism, the name of Ambrose Paré, the discoverer of the ligature, should not pass unnoticed; for it must be acknowledged that this discovery is one of the greatest triumphs of our art, and it is not to be wondered at that Paré supposed that "he was inspired by God with this good thought."

The effects of the ligature of arteries has been so well described by Jones, Travers, Veitch, Guthrie, Manec, Porta, and others, that it is unnecessary, I think, to repeat the description, especially as I have nothing new to offer on the subject.

¹ Reported by Mr. P. Hewett, in the 29th vol. of the Med.-Chirurg. Trans.

Various substances, as tape, twine, silk, catgut, horsehair, and other materials, have been employed for the ligature of arteries. In some instances a temporary ligature has been used; in others a foreign body has been interposed between the ligature and the vessel, and this plan has been adopted up to a recent date by some of the French surgeons. Roux,¹ who has probably ligatured more arteries than any surgeon in France, has used a small cylinder of diachylon for this purpose. In the operations at the commencement of the present century, four ligatures were often passed round the artery, two of them being left as ligatures of reserve. At a later period, two only were used and the artery divided between them. The cutting off both ends of the ligature close to the artery, a method first tried by Mr. Lawrence, although for a time frequently practised and highly commended by some surgeons, has gradually fallen into disuse, and I believe is now abandoned by Mr. Lawrence himself. One piece of dentist's silk is now usually employed in this country, its size varying according to the caliber of the artery. In Case 41, of ligature of the common iliac, catgut was used; hemorrhage and death took place on the eighth day, it was thought from the softening and separation of the ligature. The ligature should be pulled tight enough to divide the internal coats. It is desirable to avoid tying an artery near a large branch, so that room may be left for the formation of a coagulum; thus ligature of the femoral a little below Poupart's ligament, which was often practised by the older surgeons, was seldom successful. (Case 8.)

Porta² states that in sixteen cases of ligature of the common femoral, hemorrhage occurred in nine.

Some recent authorities of high reputation hold the foregoing precaution to be of less importance than has been heretofore believed; I must with all deference assert, that the evidence we at present possess is much opposed to their opinions. Some cases may be found of successful ligature of an artery near a large branch, but these I think are exceptions, and should not influence our practice. Mr. Porter³ says, "Another cause that

¹ *Annales de la Chirurgie*, 1841, vol. i, p. 85.

² Before cited, p. 136.

³ Porter on Aneurism, p. 187.

has been adduced as leading to secondary hemorrhage is, the circumstance of the ligature having been applied near to a collateral branch, because, in such case, there can be no internal coagulum formed, and a part of the natural process must be incomplete. It has been already stated, that more importance seemed to have been attached to this early coagulum than it deserved; and, indeed, I cannot see how it can have any influence on an artery at so late a period as when the ligature is about to separate; but the best observation on this subject may be derived from experience. I have tied the common carotid within an eighth of an inch of its origin from the innominata, with the most complete success; and yet, if there is one spot in the body where this cause of secondary hemorrhage should operate with decided effect, it is here. This theory must, therefore, be dismissed as insufficient also."

Mr. Key (Guy's Hospital Reports, 1836), in speaking of a case where the subclavian was successfully tied close to the deep cervical, says, "The dissection of this limb tends in some degree to lessen our confidence in the correctness of some dogmas that are generally received in the profession, in reference to the condition of the sac after the application of a ligature on the vessel supplying it, and the propriety of applying a ligature close to the orifice of a large arterial branch. It will be observed that the artery was tied close to the deep cervical branch, which, in this instance, gave off the posterior scapular artery, and which left the subclavian trunk after the vessel had passed the scalenus muscle."

Dr. Robertson,¹ of Edinburgh, tied the common carotid within half an inch of its origin, and the patient recovered.

Mr. Bellingham (in Case 236) successfully ligatured the external iliac close to its bifurcation for aneurism of this artery.

It sometimes happens that the coats of an artery, from their extreme brittleness, give way under the ligature. A case of this kind happened to Mr. Green, at St. Thomas's, and another to Mr. Key, at Guy's Hospital. The artery (femoral) in both cases was tied; in one death took place from secondary hemorrhage; the other recovered.

¹ Dublin Journal, vol. xii.

Mr. Mackesy¹ amputated the leg of a man forty-five years of age; the vessels cracked under the ligature like an egg-shell, several ligatures were tried, but all were unsuccessful. A curved needle was then used, so as to surround the main blood-vessels with the ligature, and this not proving sufficient, firm pressure, by means of graduated compresses (removed on the 17th day), was resorted to with success. The man recovered, and had a good stump. The case mentioned at page 37, is another example of this condition of artery. Some of the French² surgeons have recommended the introduction of a piece of bougie in this condition of artery, and the application of the ligature over it. I have never heard of the adoption of the practice in this country. A small flat ligature, I think, would be more likely to answer the purpose.

The separation of the ligature after the operation for aneurism is looked upon as an occurrence of some danger, as at this juncture secondary hemorrhage frequently happens. The time of separation varies much in different cases; but the period assigned by most of those who have written upon the subject, is too short. Sir Astley Cooper³ says, "Between the eleventh and fifteenth day the ligature usually separates; but I have known a broad ligature twenty-seven days in ulcerating."

The following is the time of separation of 150 ligatures from arteries tied for the cure of aneurisms, nearly all of them spontaneous. The numbers are given as well as the averages, as by this means the reader will be better able to form a correct inference: fractions are omitted. It must be recollected, that when a ligature does not come away until a long time after the operation, it is generally separated from the artery, and only retained by the surrounding granulations.

Common Iliac, 18, 35.

Internal Iliac, 21, 42.

External Iliac, 13, 14, 14, 15, 15, 16, 16, 16, 16, 16, 17, 17, 17, 19, 21, 21, 21, 21, 22, 22, 22, 23, 23, 24, 24, 28, 29, 29, 31, 34, 42, 42, 56. Average 22 days.

¹ Dublin Medical Press, vol. x.

² Manec, *Traité Théorique et Pratique de la Ligature des Artères*, p. 26.

³ Lectures, vol. ii, p. 58.

Femoral, 10, 11, 11, 11, 11, 12, 12, 12, 13, 13, 13, 13, 13, 14, 14, 14, 14, 14, 14, 15, 15, 15, 15, 15, 16, 16, 16, 17, 18, 19, 20, 21, 22, 22, 22, 22, 23, 23, 23, 24, 24, 26, 27, 28, 29, 29, 29, 31, 31, 33, 36, 40, 45. Average 18 days.

Subclavian, 10, 11, 12, 12, 12, 13, 13, 13, 13, 13, 14, 15, 15, 15, 16, 16, 17, 17, 18, 18, 20, 20, 20, 20, 21, 22, 27, 31, 43. Average 17 days.

Carotid, 8, 11, 11, 13, 14, 15, 16, 17, 19, 19, 20, 20, 21, 22, 25, 26, 26, 26, 31, 33, 48. Average 21 days.

Brachial, 9, 11, 12, 12, 13, 16, 18, 28. Average 14 days.

Anastomosis.—The method by which the collateral circulation is carried on after the main artery of a limb is rendered impervious by ligature or other causes, has been so fully described by Scarpa, Hodgson, Sir A. Cooper, Porta, and others, that I shall devote but a short space to its consideration.

Many opportunities have occurred of late years of examining, a considerable period after the operation for aneurism, the arteries of the affected limbs; and in the London Museums there are several interesting specimens, showing the state of the collateral circulation many years after the ligature of a large artery. The resources of nature in this respect are beautifully exemplified in the instances of total or partial obliteration of the thoracic aorta, reported at page 31. These cases may, I think, even lead us to anticipate the successful application of a ligature to the abdominal aorta. Although this artery has been tied frequently in the dog with success, in the four recorded cases in which the operation has been performed on the human subject, the patients died soon after. In Sir A. Cooper's patient, the circulation was partly restored, he lived forty hours, and a coagulum was formed above and below the ligature (Prep. St. Thomas's Museum.) The man operated upon by Dr. Murray died twenty-three hours after the operation. Mr. James's patient complained of a deadness in the lower extremities, and lived only three hours and a half.

The specimen of spontaneous obliteration of the common iliac (Plate V) in the St. Thomas's Museum, is one of the most interesting I have met with, and shows the vast power of

nature to accommodate herself to change of circumstances. The specimen (taken from a male subject thirty-five years of age) was discovered accidentally in the Webb-street dissecting-room; but, unfortunately, nothing is known of the history of the individual. It is quite clear, however, from the closely-sealed state of the common iliac, as well as from the immense increase of the collateral vessels, that the obstruction had occurred a long period before death. The limb, on the affected side, was three fourths of an inch shorter, and altogether smaller than the other. The last lumbar, middle sacral, circumflex ilii, and obturator arteries are much enlarged.

The three preparations in Guy's Hospital Museum, an account of which is given in the first volume of the Guy's Hospital Reports, are valuable illustrations of the method by which the circulation is carried on after the ligature of a large artery. In ligature of the large arteries, the anastomosing vessels are generally sufficient to carry on the circulation. Mr. Key says, in speaking of his case of subclavian aneurism, "This preparation, as well as that of the iliac artery tied by Sir A. Cooper, proves that not one large vessel is concerned in carrying on the circulation after the obliteration of the trunk, but that many minor currents contribute towards the supply of the limb, and that every small neighbouring branch assists in restoring the circulation."

It not unfrequently happens, however, that unforeseen circumstances occur, such as division of some of the collateral branches before the main trunk is tied, inflammation of the inner coat of the vessels below the ligature, chronic disease of the coats of the arteries, and the partial or total obstruction of several of the collateral branches from pressure of the sac. The last accident has frequently arisen in consequence of the surgeon deferring the operation for the purpose of allowing the anastomosing vessels to enlarge,—a proceeding in the generality of cases quite unnecessary, as numerous examples of the application of ligature for wounded arteries clearly prove.

Temperature.—One of the immediate effects of the ligature of an artery is generally a numbness and diminution of the heat of the limb; and in nearly all the recorded cases which I have met with, the result has been a decrease of temperature

for a short time. In a patient, however, whose external iliac I saw ligatured for femoral aneurism by Mr. Partridge at the King's College Hospital in November last, I observed that the temperature of the leg and thigh was increased soon after the operation. A daily account of the temperature of the limb was kept by three of Mr. Partridge's dressers, and the following was the result :—

	<i>Sound Limb.</i>	<i>Affected Limb.</i>		<i>Sound Limb.</i>	<i>Affected Limb.</i>
Nov. 27	. . 88	96	Dec. 7	. . 90	93
28	. . 89	93	9	. . 92	96
29	. . 86	90	10	. . 90	92
30	. . 88	93	11	. . 86	88
Dec. 1	. . 86	93	16	. . 94	90
2	. . 90	93	17	. . 94	90
3	. . 94	96	18	. . 93	95
4	. . 90	93	19	. . 91	93
5	. . 88	96	20	. . 90	92

The limb was always well covered with cotton wool, &c.

There is now a man in Guy's Hospital who had the external iliac tied last week (January 16th, 1847) by Mr. B. Cooper for diffused femoral aneurism. For the first three days after the operation the temperature of the diseased limb was four degrees higher than the other: on the fifth day it was the same in both. In fourteen cases besides those now mentioned, the heat of the affected side was reduced in nine; increased in three; and it was about equal to that of the opposite limb in two. In Dr. Hutton's case (of the cure of popliteal aneurism by pressure) the temperature of the affected leg was 5, 7, 6, 2, 1, degrees lower than the other.

The time at which pulsation can be felt in the arteries beyond the aneurismal swelling after the operation, varies much in different cases, and in proportion to the distance from the heart. Dr. Warren,¹ of Boston, U. S., after the ligature of the subclavian for aneurism produced by the attempt to reduce a dislocation of the humerus, could not feel the pulse at the wrist until 361 days after the operation; whilst in two cases of ligature of the brachial artery for traumatic aneurism, which I have lately seen, pulsation was present in the radial artery soon after the operations.

¹ Lancet, Dec. 1845.

The effect of the operation upon the aneurismal sac varies in different instances; thus in some cases the sac disappears altogether, or a small hard tumour is left; in others, the swelling is not much reduced in size; and in some rare examples it increases in magnitude without return of pulsation. In the case of popliteal aneurism which I had an opportunity of examining twelve years after the operation (page 148), I could discover no vestige of the sac. I have, through the kindness of my friend Mr. Adams, examined the remains of an aneurismal sac taken from a man who died recently in St. Thomas's Hospital. The femoral artery had been tied four years before for popliteal aneurism by Mr. Luke at the London Hospital. The remains of the sac are about the size of a small walnut, the parietes thickened, and of a cartilaginous consistence. The cavity is small, of an irregular shape, and quite empty.

In Sir A. Cooper's case of femoral aneurism, examined eighteen years after the operation, "the femoral artery above the origin of the profunda became distorted and irregular in shape, and was rendered somewhat obscure by its connexion with what appeared to be the remains of the aneurismal sac."

Mr. Key examined an axillary aneurism twelve years after the operation. "The sac retained a large capacity, and was filled with fibrine" (preparation in Guy's Museum.)

Mr. Porter had an opportunity of inspecting the case of carotid aneurism (Table 276) seven years after the operation. "The remnant of the artery exhibited one continuous and unbroken cord from the bifurcation of the innominata to the division into internal and external carotids, so that, although the vessel must have been divided by the separation of the ligature, it had united again, and the exact spot at which it had been tied could not be ascertained. The internal carotid also was obliterated up to the spot where the ophthalmic artery was given off within the skull. In close connexion with this was the remnant of the aneurismal sac, a small, firm, fibrous tumour, of an oblong shape, and nearly of the size and form of a very large almond."

Professor Scarpa¹ examined the arteries of a limb in which

¹ Lancet, 1828, 1829, p. 581.

the femoral artery had been tied for popliteal aneurism twenty-seven years before. The popliteal artery was the size of a large violin string, and no remains of the sac were visible.

The operation for the cure of aneurism does not appear to impair materially the muscular power of the limb. I have frequently attended the subject of the following case, who was operated upon thirty-eight years since for popliteal aneurism. J. T., æt. 62, when twenty-six years of age had never experienced a day's illness; he then observed a slight swelling in the left ham, which gradually increased, and a month after its first appearance the femoral artery was tied by Mr. Foster, at Guy's Hospital. He left the hospital three months after the operation and resumed his occupation, that of wheeling bricks; he continued this employment for two years when an abscess formed in the upper part of the thigh, and he returned to the hospital for six weeks. He calculates that when in full work *he walked thirty miles per day wheeling bricks (sixty in a barrow)*. After leaving the hospital he again returned to his employment (which occupied him during the summer months) for twenty years, and the leg was quite as strong as before the operation; he, however, suffered much from rheumatism in both legs, and was obliged to discontinue his labour ten years since. He has been troubled for many years with ulcers in the left leg, arising from blows, and he has now a deep ulcer on the ankle. His health at this present time (with the exception of chronic rheumatism in both lower extremities) is as good as it was forty years ago.

There is a man now in Guy's Hospital who was operated upon for a *large* popliteal aneurism twenty months since by Mr. Key. A very slight thickening only can be felt in the situation of the aneurismal sac. The patient states that he has continued his former employment (that of taking out soda water in a cart) without much inconvenience; he frequently carries one hundred weight upstairs. The foot is often numb and cold.

I have recently examined the two patients who were operated upon by Mr. B. Cooper for double popliteal aneurism (376, 377), and the following is the history of the cases.

J. W., orange porter, a very strong, muscular man, of good constitution, when twenty-five years of age was carrying two

hundred weight of oranges; the flooring gave way, and he fell several feet. A few months after this he felt a slight uneasiness in the ham; he entered Guy's Hospital, and the femoral artery was tied by Mr. Cooper five years since; two years subsequently the same operation was performed for popliteal aneurism in the other leg, which Mr. Cooper thought existed at the time of the first operation; but this was doubtful. On a careful examination of the popliteal spaces, I can discover no remains of the aneurismal sacs. He says, that "he is as strong on his legs as before the operation, and that he can carry three hundred-weight; thinks the leg last operated upon is rather weaker than the other."

J. F., æt. 40, a strong, muscular man, about twelve years since, whilst employed as a builder, slipped into a vault; about a fortnight after this, he observed a pulsating swelling in the right ham; the femoral artery was ligatured by Mr. Cooper, at Guy's Hospital. Four years after this operation, when pulling on a tight boot, he felt something snap in the left ham, and a pulsating tumour appeared; the artery was ligatured, and the aneurism was cured. He is now very healthy and robust, and able to attend to his business (that of a cheesemonger) without inconvenience; the feet are inclined to be cold in winter. The popliteal spaces present a natural aspect, and no thickening or enlargement can be felt.

The woman, ninety years of age (Case 307), who was operated upon for popliteal aneurism by Mr. Stevenson could walk half a mile seven months afterwards.

The man (355) who had both femorals tied for double popliteal aneurism, could carry a sack of flour twelve months after the last operation.

CHAPTER XIII.

ANEURISM OF THE INNOMINATA.

OF the twenty cases of aneurism of this artery, fifteen of the subjects were males, and five females. Their occupations were as follow : 2 soldiers, 2 sailors, a shoemaker, blacksmith, butcher, compositor, greengrocer, and one female, aged sixty-one, is mentioned as being engaged in laborious employment. In ten cases the calling is not named. Age.—Under twenty, 1 ; between twenty and thirty, 1 ; between thirty and forty, 5 ; between forty and fifty, 8 ; between fifty and sixty, 4 ; between sixty and seventy, 1.

The signs attending aneurism of the innominata, are very equivocal, and like aneurism of the thoracic aorta, until the tumour makes its appearance externally, the diagnosis is extremely difficult. Dilatation of this artery, too, is sometimes complicated with aneurism of the arch, ascending aorta, or the commencement of the right subclavian and carotid (36, 135, and 524.) If, however, the anatomical bearings of the vessel are well considered, some important guides may be afforded. Thus, the bruit, if any be present, will be heard on the right and upper part of the sternum, where the tumour generally first makes its appearance ; or sometimes it will be recognized more in the centre where the sac occasionally projects above the sternum. The trachea and right bronchus are often pressed upon, the effect being dyspnœa, and sometimes stridulous breathing ; from the same cause the blood is obstructed in its return from the head and arm, producing turgescence of the veins of the neck, and occasionally œdema of the hand and arm. The state of the pulse at the wrists will often afford us valuable assistance in our diagnosis, and should always be frequently and carefully examined. It will generally be found smaller and sometimes absent in the right radial.

Pathological Effects.—Aneurisms of this artery seldom burst internally. Of the twenty cases, not one of them terminated in this manner. One burst externally ; three occasioned death

by pressure upon the trachea; one by pressure on the right bronchus. Serous effusion into the pleura, acute pericarditis, and exhaustion, are described as having produced death in three others; six were subjected to surgical operation; one is reported "well" nine years after the operation; and in five the cause of death is uncertain.

There is an interesting and, I think, a useful fact connected with the pathology of aneurisms at the arch of the aorta, viz., the frequent closure or partial obstruction of this artery or of one of the carotids or subclavians, a circumstance surely in favour of the distal operation?

Treatment.—I know of two instances only in which aneurism of the innominata has been cured. One occurred to Mr. Porter, and will be alluded to hereafter; the other was treated by Mr. Luke, in the London Hospital, by small bleedings, frequently repeated. Digitalis was also administered, and pulsation ceased in the tumour. The man died several years afterwards of phrenitis, and the aneurismal dilatation was found filled with dense, firm coagulum, the size of a pigeon's egg, the passage of the blood through the sac being entirely obstructed. The preparation is in the Hospital Museum.

Although the chance of cure afforded by the ligature of the carotid or subclavian, or both of these arteries, is but slight, I think that the life of the patient might in many cases be prolonged by the operation, which I believe has been too hastily abandoned. I know of no very recent case where ligature of the artery on the distal side of the tumour has been practised; but *I have no doubt that this operation, like that of pressure for the cure of popliteal aneurism, will be hereafter revived.* And if at the same time gentle pressure (where circumstances admit of it) be made upon the sac, I anticipate a more favorable result than has hitherto occurred. It must be recollected that Brasdor's operation is only had recourse to where Hunter's is impracticable; and unless some attempt is made to relieve the patient, death is almost inevitable. The cases treated of by Wardrop, Bush, and Montgomery (291, 310, 335), to be mentioned in the 15th chapter, when speaking of carotid aneurism, serve to strengthen this opinion.

Of the five cases before spoken of, in which the distal ope-

ration was performed for the cure of aneurism of the innominate, the following is the result :

Case 49. Mr. Wickham, carotid and subclavian tied : death eighteen weeks after from bursting of the sac.

253. Dr. Hutton, right carotid tied : death on the 76th day. Tumour enlarged before death.

314. Mr. Evans, right carotid tied : well nine years after the operation.

349. Mr. Fearn, carotid first tied ; subclavian two years after : death four months from the last operation.

402. Mr. Key, right carotid tied : death an hour after the operation.

In addition to the above, the carotid or subclavian have been tied for aneurism of the innominate with an unfavorable result by Fergusson, Mott of New York, Morrison, Scott, Laugier, and others.

The application of a ligature to this artery has in all cases been unsuccessful.

Mr. Liston,¹ in speaking of ligature of the innominate and the operations for aneurism at the lower and anterior part of the neck, says, " I do not think that anything would induce me to have recourse to the operation on the innominate, or even to this modified operation. It is one attended with very great difficulty ; the parts are deeply seated, and there are very important organs lying close upon the vessel. I sincerely hope that I never shall be called upon to be obliged to perform any of these operations again."

Mr. Porter attempted to tie this artery ; but on cutting down upon it, he thought it not safe to apply a ligature ; and, strange to say, the patient recovered, pulsation ceasing entirely in the sac ; this probably arising from inflammation and plugging of the artery.

In the subjoined case, the subject of which I saw operated upon in Guy's Hospital by Mr. Key, and which he has kindly permitted me to publish, a somewhat similar process appears to have taken place.

Mrs. —, æt. 46, admitted into Guy's Hospital under Mr. Key, April 25th, 1844, in consequence of a small pulsating tumour, about the size of a pigeon's egg, above the right

¹ Lectures, *Lancet*, 1845.

clavicle. She is a greengrocer's wife, and has been accustomed to use the right arm a great deal in weighing vegetables, coals, &c. The swelling was first observed three months since. She has complained of what she called rheumatic pains in the right arm, but her general health has been good. The pulse at the wrist about 80, and both radials beating with the same power; the left perhaps a little more feeble than the right. No bruit can be detected over the tumour, and the sounds of the heart are natural. Drs. Addison and Hughes believe that there is a slight dulness on the right side, but from what cause it is difficult to say. Dr. Hughes suggests that the right bronchus may be pressed upon by an aneurism of the innominata, but this is only conjecture. Mr. Key, after weighing well the circumstances of the case, decided upon passing a ligature around the innominata; or, if this artery should be found aneurismal, he proposed tying the common carotid near its origin.

The operation was commenced by making an incision along the inner edge of the sterno-mastoid muscle, half of which was divided; another incision at right angles with this was continued along the clavicle, and the triangular flap dissected back. Mr. Key now followed the common carotid to its origin; much difficulty was experienced during this part of the operation, and it was necessary to tie five divided veins. Mr. Key attempted to pass the needle round the innominata; but on a second examination he discovered what appeared to be an aneurismal sac behind the subclavian; but its exact situation could not be ascertained. The woman, who bore the operation remarkably well, was removed to her bed much exhausted. In the evening she was restless and wandering, but gradually improved. Pulsation in the sac was absent on the second day. On the seventh day venous hemorrhage took place from the wound; but this was soon arrested. On the eighteenth day she was going on tolerably well: the ligatures from the veins had come away; but the sac had increased in size, and there was much pain in the right arm. On the twentieth day the breathing became difficult; this gradually increased, the sac continued to enlarge, and at length pressing on the trachea stopped respiration, and she died on the twenty-third day after the operation.

Inspection.—Heart and valves normal; the ascending and descending aorta studded with cartilaginous and atheromatous deposit; a small aneurism was found in the descending thoracic aorta; the carotid was perfectly healthy; the innominate, immediately after its origin, formed an oblong aneurismal dilatation occupying the whole extent of the artery; a contraction had taken place in the sac where it passed between the scaleni (or probably the artery remained of its natural caliber at this spot in consequence of the obstacle to its dilatation caused by these muscles); the subclavian was then dilated, so as to form a thumb-like process; the sac was filled with dense, firm coagula, leaving a small channel for the passage of the blood; the coagulum was supposed to have formed after the operation, from inflammation of the vessel; several indurated glands were situated at the posterior part of the sac; nothing remarkable was observed about any other part. Death appeared to have been occasioned by the enlargement of the sac after the operation, and its consequent pressure upon the trachea. The preparation is in Guy's Hospital Museum.

CHAPTER XIV.

ANEURISM OF THE SUBCLAVIAN.

Twenty-six cases of subclavian aneurism are recorded in the Table: of these, twenty-five were males and one a female. Fifteen occurred in the right subclavian, eight in the left, and in three cases the situation is not stated.

Occupations.—A lady, 3 ostlers, 2 labourers, a clergyman, soldier, porter, weaver, carter, tailor, clerk, wood hawker, bargeman, rope-maker, and a grinder and polisher. In nine cases the calling is not named. Many attributed the disease to external injury.

Age.—Between twenty and thirty, 1; between thirty and forty, 11; between forty and fifty, 4; between fifty and

sixty, 3 ; between sixty and seventy, 1 ; between seventy and eighty, 1 ; not stated, 5.

Operation.—Of the 26 cases, 10 were ligatured successfully, one was cured by pressure, one patient refused operation, and one aneurism burst externally. The deaths after ligature were 5 of them occasioned by hemorrhage, 2 by suppuration of sac, and the others as follow—inflammation of right pleura, irritation, apoplexy, exhaustion, “chest disease,” and pleuritis.

Diagnosis.—The diagnosis of this aneurism is in some cases extremely difficult, and the artery has, in several instances, been tied where no aneurism was present. Glandular tumours in contact with the artery, exostosis of the rib, aneurismal dilatations of the innominate and arch of the aorta, have been mistaken for subclavian aneurism. I have lately seen a case of supposed subclavian aneurism, in which the ligature of the artery was contemplated ; the man, however, died suddenly, and the aneurism was found in the arch of the aorta.

Aneurisms of this artery seldom attain a very large size unless they become diffused. In the Museum of St. Thomas's Hospital there is a remarkable instance of this kind.

R. S., æt. 46, a country labourer, admitted under Dr. Burton, October 10th, 1837, died November 29th, 1837. On the day of admission the integuments of the left clavicular, subclavicular, mammary, axillary, and scapular regions were greatly distended, tense, and livid, so as to suggest the existence of a fungoid tumour. An impulse synchronous with the radial pulse could be distinguished over the tumour, but no bruit ; the action of the heart was quite normal, the patient suffered intense pain, and could not bear pressure on the affected parts : his death occurred suddenly from profuse hemorrhage through the integuments about the base of the left scapula. A large aneurismal dilatation (commencing at the origin of the left subclavian) was found in the left cavity of the chest, and the scapula, which formed the posterior wall, was pushed back, the ribs being partly absorbed. The aneurismal cavity would contain five or six pints of fluid. The gentleman who attended the patient before his admission into the hospital is since dead, and I am, therefore, unable to obtain the early history of the case.

Operation ; Anomalies.—Harrison¹ observes, in speaking of the subclavian arteries, that “no other arteries in the body present a greater variety in the number and order of their branches : so uncertain are they in this respect that seldom will any description be found to correspond exactly to nature.” Velpeau² has seen the vein between the scaleni with the artery, and the artery occupying the place of the vein. The latter vessel may be more elevated than usual, and surrounded by the brachial plexus of nerves. I am surprised that these irregularities have not occasioned more frequent embarrassment to the operator. I find, however, but very few recorded instances of this kind. I saw Mr. Liston (Case 358) tie the right subclavian anterior to the scalenus, at the University College Hospital (his intention was to have tied the carotid also) ; the subclavian came off from the innominata quite behind the carotid, and, as may be supposed, it occasioned at first some little difficulty. I have seen the sac punctured by the needle in this operation ; bleeding to a fearful extent took place, although the wound was plugged with German tinder ; and the man sunk after a few hours. A similar accident occurred in Cases 79 and 210.

Mr. Collis, in Case 106, thought he wounded the pleura. Ligature of some of the nerves is probably one of the most frequent accidents attending the performance of this operation. Mr. Liston, in Case 117, had surrounded the inferior nervous band by the ligature, but he soon discovered his mistake, and by lifting up the nerves with the thread, he turned the accident to his advantage. Dupuytren included a large nerve with half the artery in the ligature.

Ramsden tied one of the nerves instead of the artery, and the patient died soon afterwards from the bursting of the aneurismal sac.

White, of Manchester, included three nerves in the ligature, and Desault the brachial plexus ; both of these patients died of mortification of the limb.

Ligature of the vein with the artery, division of the smaller trunks, and injury to the external jugular vein are other untoward events that may occur during the operation.

¹ Surgical Anatomy of the Arteries, p. 127.

² Nouveaux Elémens de Médecine Opératoire, p. 201. 1839.

Sir A. Cooper first attempted the ligature of this artery in 1809; and it was effectually tied by Ramsden at St. Bartholomew's Hospital, in November of the same year. Sir W. Blizard, Galtié, T. Blizard, and Colles afterwards tied the artery, but all their operations were unsuccessful. Dr. Post, of New York, in 1817, was more fortunate.

The subclavian artery has been ligatured in the three parts of its course: first, anterior to the scalenus, by Colles (106); Liston (352 and 358); Partridge (52); Hayden, and others have also tied the vessel in this situation, but all the cases have terminated fatally.

The artery was first ligatured between the scaleni by Dupuytren, in 1819, on the left side; and this was followed by another successful operation. Liston has since had two successful cases.

The above operations would be practised only where the increase of the aneurismal sac precludes the application of the ligature in the usual situation; but few surgeons, I apprehend, would now attempt the former operation.

The ligature of the subclavian, in the third part of its course, has frequently, since Dr. Post's case, been attended with a favorable result.

Of the twenty-six cases of spontaneous aneurism of this artery, alluded to in the Table, the ligature was applied in twenty-three instances. One patient was cured by pressure and Valsalva's treatment (69); another refused to be operated upon, and one aneurism burst externally. Eleven were successful, and twelve terminated fatally. Of these, five died from hemorrhage, two from inflammation of the right pleura, one from irritation, one from mortification of the arm, one from apoplexy, one from exhaustion, and one from chest disease. In four of the unsuccessful cases, the artery was tied anterior to the scalenus; in two, the innominate was ligatured; and in two others, the sac was perforated by the needle: so that if we exclude these eight cases, the subjects of which were none of them favorable for operation, the mortality from ligature of this artery, when the operation is performed at an early period of the disease, and in the third stage of the vessel, is not so great as at first sight appears.

CHAPTER XV.

ANEURISM OF THE AXILLARY AND BRACHIAL ARTERIES.

AXILLARY ARTERY.

THE diagnosis of this aneurism is less difficult than the preceding. The aneurismal sac, probably on account of the greater space in the axilla, is generally of larger size, and increases more rapidly. Indurated and suppurative glands have been mistaken for this disease, and the aneurismal sac has been punctured for supposed abscess.

Of the 18 cases in the Table, seventeen were males and one female; eight were in the right, seven in the left, and in three cases the side is not stated.

Occupations.—3 labourers, 2 fishermen, 2 sailors, a tide-waiter, cooper, groom, coachman, and soldier. In six cases the calling is not named.

Age.—Between thirty and forty, 8; between forty and fifty, 4; between fifty and sixty, 2; between sixty and seventy, 3; not given, 1.

Operation.—The success attending the ligature of the subclavian artery for spontaneous aneurism of this vessel forms an interesting contrast with the preceding. Thus, of the 18 examples of this disease, the ligature was applied in fourteen to the subclavian, and in one to the axillary. Eleven of these operations were successful; three of the deaths arose from hemorrhage, and one from gangrene. One patient was supposed to have been cured spontaneously, another refused to be operated upon, and in a third the result is not known.

It is sometimes difficult to determine whether the aneurism is seated in this artery or the subclavian, but it is sufficient, for all practical purposes, to know that the farther the disease is from the heart, the greater is the chance of success.

In addition to the cases of ligature of the subclavian artery which I have related, numerous operations have been performed both by British and continental surgeons, for an account of which I must refer the reader to an excellent

paper, by Dr. Norris, in the 'American Journal of Medical Sciences,' 1845. Dr. Norris's Table consists of 69 cases of ligature of this artery for aneurisms and wounds; of these, thirty-six of the patients recovered, and thirty-three died.

BRACHIAL ARTERY.

Spontaneous aneurism of this artery and its branches is very rare; a single case only (269) is mentioned in the Table. Mr. Liston¹ met with one example. In the fourth volume of the 'Journal de la Chirurgie' another case is related. Scarpa² mentions two instances. Sir A. Cooper speaks of aneurism of the ulnar artery; and in the College Museum there is one of the inferior portion of the radial artery from Mr. Langstaff's collection.

CHAPTER XVI.

ANEURISM OF THE CAROTID ARTERY. •

THE Table contains 25 cases of aneurism of this vessel; thirteen were males and twelve females; ten occurred on the right side and eight on the left. In two patients, both arteries were affected, in five the situation is not named.

Age.—Between twenty and thirty, 2; between thirty and forty, 7; between forty and fifty, 5; between fifty and sixty, 5; between sixty and seventy, 4; between seventy and eighty, 1; and the age of one is not stated.

Occupations.—4 ladies, 3 porters, a clergyman, glass-cutter, sawyer, servant, labourer, soldier, fisherman, and a negro; in ten cases the occupations are not given.

It will be seen from the foregoing statement that aneurism of this artery is nearly as frequent in women as in men; a fact that has not been noticed by any preceding writer. The exposed state of the neck in females, and their consequent liability to injuries on this part, will, I believe, fully account for the circumstance.

¹ Operative Surgery, p. 181,

² Before cited, pp. 175, 177.

Diagnosis.—The diagnosis of this aneurism is not generally very difficult: although three instances have come within my own observation where a glandular tumour of the neck has been mistaken for it; and one in which the aneurism was thought to have been a glandular swelling. The most frequent situation for carotid aneurism is near the bifurcation of the common carotid. The tumour is usually small at first; sometimes not larger than a pea, at others it is as big as a walnut; and if the blood be diffused, the swelling will rapidly attain a considerable magnitude. These aneurisms may exist for some time before they are observed; and the pulsatory motion in the neck is often the circumstance which first directs the patient's attention to the part. If the aneurismal sac be of a moderate size, and its contents fluid, but little difficulty will be experienced in the diagnosis; a bellows-sound will be heard over the tumour, and if pressure be made upon the artery below the dilatation, so as to stop the current of the blood, the swelling will be considerably diminished. When the aneurism is seated low down in the neck, there is more difficulty in forming a correct opinion. Aneurisms of the innominate and arch of the aorta have both been mistaken for carotid aneurism. Two instances of this kind are mentioned by Sir A. Cooper;¹ in one, a large bag was found in the neck communicating with the cavity of the aorta; the other occurred to Allan Burns, and it was proposed to perform the operation for aneurism. Sir Astley, who was consulted by letter about the case, said, "take care it is not an aneurism of the aorta." The patient died without operation, and the disease proved to be as Sir Astley had surmised.

Mr. Guthrie² says, "A swelling at the root of the carotid is more likely to be an aneurism of the arch of the aorta, or of the arteria innominate, than of the carotid itself; and the stethoscope will remove all doubt." I fear our greater experience in the use of this instrument will not now enable us to come to the same conclusion. Enlargement of the thyroid gland, thickening of the cellular substance near the sheath of the artery, chronic abscess, diseased lymphatic glands, and simple dilatation of the vessel, have not unfrequently been

¹ Lectures, vol. ii, p. 33.

² Before cited, p. 397.

mistaken for aneurism. Sir A. Cooper¹ observes, "Pulsating tumours in the neck are common, and may be distinguished from aneurism by desiring the patient to make an effort to swallow. Carotid aneurisms generally do not move with the larynx or trachea; other pulsating tumours in the neck are, for the most part, connected with the thyroid gland, and obey the motions of the air-tube in swallowing."

Allan Burns,² in speaking of this aneurism, says, "the carotid is more prone to disease when it bifurcates. I have repeatedly, on the dead subject, met with dilatation of the common carotid and the root of the internal carotid forming a cyst nearly as large as a filbert; and I have twice felt a similar state of the vessel in the living body. In some of the former cases the texture of the artery was altered, but in most of them the dilatation had taken place independently of any disease of the coats. In the two instances in which the artery was enlarged in the living subject, the patients experienced no inconvenience, nor for some months, during which I had an opportunity of seeing them, did the dilatation seem to advance."

In August last I saw a blacksmith, æt. 61, under the care of Mr. Green, at St. Thomas's Hospital, who was admitted for ulceration of the foot. After being three weeks in the hospital it was discovered accidentally that he had a pulsating tumour in the left side of the neck, about the size of a small apple; it was situated above the clavicle. A distinct bellows-sound was heard over the tumour; he was not conscious of having received any violence to the part, and he stated that it had existed for fourteen years; no inconvenience had resulted from it, and his health had been tolerably good. He had never had his mouth affected by mercury; the right carotid appeared also to be dilated; it was supposed that he laboured under disease of the mitral valve.

Sometimes an aneurismal dilatation of the cellular coat of the artery may exist without pulsation. I was consulted by a young woman several months since, who, when falling (a few days before I saw her), struck her neck against the corner of a chair. The neck became painful; and soon after the accident a hard circumscribed swelling, about the size of a

¹ Lectures, p. 46.

² Above cited.

small walnut, was observed. The tumour is seated about midway between the angle of the jaw and the sternum: it is nearly immovable, and in close contact with the carotid artery; there is no discoloration of the skin, and no bruit is heard over the tumour. Cold spirit lotions were applied, and after a short time the tenderness subsided. I had an opportunity of watching the case for several months, and I could observe no diminution in the size of the tumour. I have no doubt that this swelling contained coagulated blood, whether furnished by the carotid artery itself or by one of the small vessels in its sheath, it is difficult to say. I am inclined, however, to the former opinion, as I know of no instances where the rupture of a small artery or vein has produced this kind of swelling. In the Museum of St. George's Hospital I have inspected a very interesting case of carotid aneurism taken from a man, *æt.* 39, who died in the hospital. A sensation as of a sudden stab was felt in the neck; this was followed by swelling and sore throat, with what looked like a polypus in the nose; the enlargement in the neck suddenly increased, and the man died from suffocation. No operation was performed, as some difference of opinion existed respecting the nature of the case. A very slight opening is seen near the bifurcation of the common carotid, close to which is a small spot of atheromatous deposit; the artery in other parts healthy; on the outside of the vessel is a large dense coagulum the size of two fists, and hollow in the middle.

I have recently seen the undermentioned case of carotid aneurism.

Miss B., *æt.* 60, applied to me July 2d, 1846, in consequence of a pulsating tumour about the size of a pigeon's egg near the angle of the left jaw. She first observed this swelling about seven weeks since when looking into the glass, and she thinks that it has gradually increased in size. On pressing the artery below, the sac is easily emptied; a distinct bellows-sound is heard over the tumour on applying the stethoscope. She has been attended by a surgeon in the country. She is of a spare habit; has been subject to much mental anxiety, and her health has always been delicate; her grandfather, father, and brother died suddenly; she does not remember to have had a blow on the neck, and has never been

salivated; the sounds of the heart natural, but its impulse rather greater than usual; respiratory murmur normal; the pulse about 80, the right much stronger than the left; tongue furred; secretions unhealthy; nights restless; urine not albuminous; she does not experience much inconvenience from the tumour, except when she lies upon the affected side; there is slight twitching of the muscles of the face occasionally, and she sometimes complains of numbness of the left arm and hand. The aneurism is seated at the bifurcation of the carotid.

July 13th, 1846. She remained under my care until this morning, when she left for the country. I gave her light bitters with soda, and a mild mercurial occasionally. Her health, however, was not much benefited by this treatment. I at first proposed tying the artery; but as she had a great objection to the operation I did not (taking the state of her health into account) particularly urge the immediate application of a ligature, but told her, in the event of the tumour increasing, to have the artery tied at all hazards, being probably the least of the two evils. She said, that "she would not, under any circumstances, be operated upon."

I have just heard of this lady (January 27th, 1847), and she states that the tumour has not increased in size, and she does not suffer more inconvenience than formerly.

Operation.—Before tying the carotid, the anomalous distributions must not be forgotten, although these are not of frequent occurrence, and if present, would not be likely to produce much embarrassment. The principal irregularities that have been met with are, high division of the innominate, the right carotid coming off from the aorta; the two carotids, or the left carotid and subclavian, arising from a common trunk; the right carotid and subclavian arising from the aorta, the innominate being absent, &c.

The chief accidents likely to occur during the operation are the wounding of the vein or the inclusion of this or the par vagum in the ligature. A case has recently come to my knowledge where a surgeon tied the vein instead of the artery, and the mistake was not discovered until after death. The patient was a child, and the operation was required for hemorrhage resulting from abscess in the neck.

Barovero,¹ of Turin, tied the internal jugular vein with the artery: the patient died on the 69th day, of gastric fever.

Injury to the vein, both by the needle and knife, has been followed by fatal consequences.

Of the 25 cases of carotid aneurism, four were not operated upon, and twenty-one were treated by ligature. Ten of these operations were successful, and eleven terminated fatally. Five of the operations were performed on the distal side of the sac; three of these (40, 291, 310) are reported to have had a favorable issue; and the lives of the remaining two (292 and 335) appear to have been prolonged by the operation. The causes of death in the eleven fatal cases were as follow: hemorrhage, five; inflammation of the sac and artery, two; spasm of the glottis, one; and in three the cause is doubtful.

Effects of Ligature.—Numerous experiments have been performed by Valsalva, Bichat, Van Swieten, Sir A. Cooper, Spence, Kellie, Jobert (de Lamballe), Mayer, and Porta, upon the lower animals, for the purpose of ascertaining the effect of the ligature of one or both of the carotids upon the cerebral circulation, and the results have varied in different cases. In some instances the operation has been followed by drowsiness, convulsions, palsy, and other symptoms of cerebral derangement. Pulmonary apoplexy has occurred in some cases. If, however, the operations are carefully conducted, it may be inferred that in the very great majority of cases, one or both of the carotids may be tied without any injurious effects to the brain of a permanent kind. Mayer,² of Bonn, applied a ligature to the carotid in eighteen of the lower animals with various effects. When both carotids were tied, very formidable symptoms followed, and the greater number of the cases had a fatal termination. The animals operated upon were a horse, a marmot, dogs, rabbits, and pigeons.

Some of the best conducted experiments I have met with, were performed by Jobert³ (de Lamballe). He ligatured the carotids in eight horses, and all died. The comparative smallness of the vertebrals in this animal will, however, account for the fatality. "These arteries in the horse diminish consider-

¹ Edinburgh Medical and Surgical Journal, vol. xliii, p. 483.

² Ibid.

³ Mém. de l'Académie Royale de Méd. tom. ix, p. 57.

ably in size on entering the cranium, and are less voluminous than those of the dog." If the pneumogastric nerves were included, nervous symptoms manifested themselves, and death took place two hours after the operation. When the arteries alone were tied, life was prolonged for some hours. Death in these cases was produced by pulmonary apoplexy. Bleeding always appeared to retard the fatal event. Both carotids were tied at the same time in a sheep, a calf, and four dogs, and the animals appeared to suffer but little inconvenience. Two young dogs came when called, and when left alone, howled. Jobert concludes from the above experiments, that the vertebral arteries suffice for the circulation of blood in the brain; that the ligature of the carotid produces no lesion of the cerebral functions; but *that the respiratory organs are chiefly affected*, and the lung transformed into a "poche de sang."

Porta,¹ in speaking of ligature of the carotids in the lower animals, says, "In some animals death follows the operation; but in more than a hundred cases of ligature of one or both carotids, I did not find either in dogs, sheep, or goats, disturbance of the nervo-muscular systems from a deficient supply of blood to the ligatured part. In 32 horses, asses, mules, and calves, alarming symptoms occurred in five cases. In three horses, after the ligature of the second artery, tremors and convulsive movements of the legs, trismus, and difficulty of breathing were followed by death. Two mules, whose carotids were tied at the same time, suffered from paralysis of the extremities and died; one 18 and the other 24 hours after the operation."

The ligature of the carotid in the human subject, as might be expected from the difference of the distribution of this vessel in the lower animals, as well as from their greater power of enduring pain, has not been attended with such favorable results. Dr. Millar, in an excellent paper in the 'Edinburgh Monthly Journal of Medical Science,' 1842, comments largely on Jobert's experiments, and has adduced numerous cases to prove that chest symptoms, especially engorgements of the lungs, frequently follow the ligature of the carotid in the human subject. In the 935th Number of the 'Medical Gazette', Dr. Norman Chevers has published a very interesting communication on the effects of

¹ Before cited, p. 251.

the obliteration of the carotid arteries upon the cerebral circulation. Fourteen cases are alluded to in which symptoms of cerebral disturbance of a serious nature followed the obliteration of one or both these vessels; either from spontaneous obstruction, or that produced by ligature. Twelve of these cases had a fatal termination. Dr. Chevers observes, "In the course of the present inquiry, I have perused nearly all the recorded cases in which the carotid artery has been tied, and find that, in very many of the patients who did not die of brain disease, cerebral symptoms of a very decided kind occurred, such as drowsiness, giddiness, dizziness, delirium, paralysis of the corresponding side of the face, severe pain in the head, alarming faintness, vertigo (not attributable to loss of blood), &c. Indeed, in most of the cases, some one or more of these symptoms has presented itself."

In conclusion, Dr. Chevers adds, "It is probable that in some of the cases where it is thought necessary to secure the primitive carotid artery previously to removing tumours of the neck and head, it would be far better that the surgeon should make up his mind to contend with an active hemorrhage, than that he should submit his patient to the chance of fatal hemiplegia, even although he believed that chance to be a remote one."

I have recently seen the carotid artery tied in two instances, and neither of the patients exhibited the slightest indications of brainular disturbance.

I am obliged, reluctantly, to dissent entirely from the conclusions of Dr. Chevers, and if the chapter on Circoïd Aneurism is referred to, I think that abundant evidence is there afforded of the little danger that is likely to accrue from the ligature of this artery; especially in cases of this description; and I am induced to think that ligature of the carotid might be more frequently practised with advantage for tumours of the head and face than most surgeons are inclined to suppose. In vascular tumours of a rapid growth, the ligature of the carotid, before the excision of the tumour is attempted, has sometimes been attended with a good result. I have lately had a female under my care, 35 years of age, with a malignant tumour of the cheek, which increased so rapidly that it destroyed her in a few months. In the first instance, I was

desirous of placing a ligature upon the carotid of the affected side, and a short time afterwards upon the opposite. The patient, however, would not consent. The proposed operation probably would not have cured the disease, but I am inclined to think that the patient's life might have been considerably prolonged by it.

Dr. Pattison,¹ of New York, tied the carotid previously to the removal of a tumour from the face. The patient recovered.

Mr. Goodlad² pursued the same practice before removing a tumour from the face, the circumference of which was twenty inches. The case terminated successfully.

Both carotids have recently been tied by Dr. John Ellis³ for hemorrhage from a gunshot wound of the tongue; the ligature of one carotid not arresting the bleeding, Dr. Ellis tied the other four days and a half afterwards: when the ligatures were applied, no bad effects were observed. The pulse was more frequent, but there was no difficulty of breathing for twenty-four hours. The respiration at this time became impeded and accompanied with pain and heaviness in the chest. The patient was bled from the arm and cupped, a course of belladonna was administered, and he soon recovered.

The most remarkable cases of ligature of the carotid artery on record, are related by Mr. Preston, in the 5th and 6th vols. of the Calcutta Medical Society's Transactions, 1831, and as they bear upon the present question, viz. the effect produced upon the brain by this operation, I shall briefly notice them. I am not aware that any subsequent history of the cases has been published. Mr. Preston believed that the ligature of the common carotid artery might be serviceable in inveterate cases of epilepsy, and other diseases depending upon determination of blood to the brain. On the 4th of February, 1831, he proceeded to tie the carotid for a severe case of epilepsy, in a man 25 years of age. The patient experienced no untoward symptoms after the operation, and in March, 1832, the fits had not returned, and he was considered cured. In another man, æt. 50, affected with hemiplegia, the carotid was tied on the 25th of October, and on the 22d of December he walked

¹ Burns's Surgical Anatomy, p. 465.

² Medico-Chirurgical Transactions, vol. vii.

³ New York Journal of Medicine, 1845.

about daily, complained only of pain in the paralytic arm, and all other symptoms were removed. This man (although a hard drinker) in March, 1832, continued in good health.

In a third case of a man, *æt.* 24, the right carotid was tied for partial paralysis on the 2d of September, on the 7th he was free from headache, and on the 27th of the same month he walked five miles. On the 10th of October the left carotid was tied, and on the 11th of November he was discharged. The vision continued imperfect, but in every other respect he had entirely recovered his health. It is not stated whether the operation was thought to have impaired the sight.

A man, *æt.* 51, who had had epilepsy for six years, was the subject of the last operation. One carotid was tied on the 23d of August, and the other on the 14th of November. The fits were not removed, but Mr. Preston thought that the patient's life had been prolonged by the operations.

It cannot be denied (although the cases adduced are many of them of a very doubtful character) that the ligature of the carotid has sometimes been followed by cerebral mischief; but I think that the evidence we at present possess, is not sufficient in any case to prevent the performance of the operation. The knowledge, however, of the possibility of the occurrence of cerebral symptoms after the operation, as well as others of a dangerous nature, should not be lost sight of.

The softening of the brain, which has occasionally followed the obliteration of the carotid, appears to bear some analogy to the gangrene of the lower extremities, which sometimes results from the ligature of the iliac and femoral arteries. In both instances I apprehend that the morbid change is produced by a deficient supply of blood to the diseased part; occasioned by inflammation and obstruction, either of the collateral branches or capillary vessels. For it must be recollected that many of these vessels, in consequence of the closure of the main trunk, are in a state of over-distension from the increased quantity of blood they are called upon to circulate.

This occlusion of the carotids does not appear materially to affect either the bodily or mental powers of the individual. The lady operated upon six years since by Mr. Key, Case 490 (I learn from Mr. Grouse, of Hadleigh, Suffolk, her present medical attendant), "has lost none of her intellectual faculties,

and the functions of the brain have been in no way impaired by the operation."

Sir A. Cooper,¹ in speaking of Case 22, (in the Table of Aneurisms,) which he examined thirteen years after the operation, says, "The man worked in the employment of a large iron master, and he enjoyed good health up to the time of his death, which was occasioned by apoplexy."

Dr. Mussey,² in alluding to the case in which he tied both the carotids, says "Most of the time since his recovery from the operation, he has enjoyed good health. Occasionally he has had symptoms of cerebral plethora, indicated by a pain or a sense of fulness in the head, and a congestion of the vessels of the brain, from which important relief or a speedy cure has been gained by a single bleeding. With the exception of about one year, he has been a hired labourer in my family, since his convalescence from the last operation, and by his intelligence, activity, power of endurance, and fidelity, secures to himself as high wages as any man in the country is able to command."

CHAPTER XVII.

ANEURISM OF THE COMMON ILIAC, EXTERNAL ILIAC, AND GLUTEAL ARTERIES.

Common iliac.—Only 2 cases of aneurism of this artery are mentioned in the Table (222, 423), both occurring in males. One was a varicose aneurism, and in the other case the aorta was tied by Dr. Murray.

External iliac.—Nine males were the subjects of aneurism of the external iliac.

Age.—Between twenty and thirty, 2; between thirty and forty, 4; one was forty years of age, another fifty-six, and in one case the age is not given.

The occupations named are,—a smith, foot-soldier, brush-maker, labourer, porter, and in four cases they are not stated.

In two cases (41 and 53) the common iliac was tied; in the first, death took place on the eighth day from hemorrhage,

¹ Guy's Hospital Reports, vol. i.

² American Journal of Medical Sciences, 1837.

and in the last the operation was successful. In four cases the external iliac was ligatured successfully; one was cured by pressure; another is reported as a spontaneous cure; and in one case in which both the femoral artery and abdominal aorta were tied, death took place a few hours after the last operation.

Gluteal.—Two cases are related (24, 277); the first occurred in a negress, who recovered after the tying of the internal iliac. A merchant, æt. 34, was the subject of the second, which was cured by pressure in fourteen days.

CHAPTER XVIII.

ANEURISM OF THE FEMORAL ARTERY.

NEXT to the popliteal, the upper third of the femoral artery is the most frequent seat of external aneurism. Sailors appear to be peculiarly subject to the disease in this situation: the flexion and extension of the thigh in mounting the rigging, and the violent exertions which they are obliged to make, and often when under the influence of alcohol, are the most likely causes.

Of 66 cases of aneurism of this artery (61 males and 5 females), 27 were in the right, 17 in the left, 21 are marked femoral or femoro-popliteal, and in one case both femorals were affected; 22 are noticed as being in the groin, 4 as near the groin, and 19 as in the upper third.

Occupations.—Of these, 12 were sailors, 5 labourers, 3 soldiers, a coachman, baker, whitesmith, brazier, musician, tailor, butcher, car-driver, coachmaker, printer, tin-plate worker, footman, carpenter, carter, porter, sugar-baker, striker in an iron foundry, and bookbinder. The calling in twenty-seven cases is not given.

Age.—Under ten, 1; between twenty and thirty, 11; between thirty and forty, 23; between forty and fifty, 18; between fifty and sixty, 6; between sixty and seventy, 1; between seventy and eighty, 2; and one was eighty years of age; in three cases the age is not stated.

Operation.—In these 66 cases the external iliac alone, was ligatured forty-three times; and in two other instances the femoral was tied also: 36 of these cases terminated favorably; and of the 10 unsuccessful, 3 died from hemorrhage, 2 from sloughing of the sac, 2 from gangrene, 1 from exhaustion, 1 from tetanus, and 1 without any apparent cause. The femoral artery alone was tied in 12 cases, and these, with three exceptions, terminated favorably; 2 dying from hemorrhage, and no cause is assigned for the other death. Amputation was resorted to in five instances with complete success. Two cures were effected by pressure, and one spontaneously.

CHAPTER XIX.

POPLITEAL ANEURISM.

THE popliteal artery is more subject to aneurism than any other vessel excepting the thoracic aorta. The causes of the frequency of the disease in this situation have been alluded to in a former part of the work (p. 114). Morgagni stated that postilions and coachmen were more subject to this form of aneurism; and this error has been repeated by the greater number of surgical writers since his time. In the Table only one case is mentioned as having occurred in a postilion and three in coachmen.

The Table contains 137 aneurisms of the popliteal artery: 133 were males and 4 females. In 44, the left side was affected; in 40, the right side; in 42 the situation is not named; and 11 of the patients had double popliteal aneurisms.

Age.—Between twenty and thirty, 27; between thirty and forty, 61; between forty and fifty, 22; between fifty and sixty, 11; between sixty and seventy, 2: one female was ninety years of age, and in 13 cases the age is not given.

Occupations.—15 sailors and bargmen, 10 soldiers, 7 porters, 6 labourers, 3 gentlemen, 3 coachmen, 3 blacksmiths, 3 bakers, 3 shoemakers, 3 market-gardeners, 3 servants, 2 brickmakers,

2 carpenters, 2 tailors, and 1 of each of the following—brewer, coachmaker, miller, flesher, coalheaver, policeman, carter, horsekeeper, groom, carrier, stonemason, carman, plumber, bricklayer, rough-rider, greengrocer, farmer, plasterer, carrier, shopkeeper, cotton weaver, cowkeeper, mealman, brass-founder, rope-maker, organ-builder, workhouse pauper, butler, pipemaker, postilion; not stated, 42.

Operation.—Of the 137 patients affected with popliteal aneurism, 119 were cured and 18 died. In 110 cases the Hunterian operation was performed; in 91 of them with complete success, and 7 others terminated favorably after amputation of the limb, the ligature having been first used. One patient recovered after amputation without the ligature; 16 were cured by pressure, and the 4 others spontaneously. Of the 12 deaths that occurred after ligature, 4 were occasioned by hemorrhage, 3 by gangrene, and 1 by each of the following—fever, chest disease, shock of operation, tetanus, and phlebitis. Of the 6 remaining patients, 3 of the deaths took place after amputation (alone), 2 died without operation, and in one who was affected with aortic as well as popliteal aneurism, death was occasioned by the bursting of the former as soon as the integumental incision was made.

The 11 patients affected with aneurism in both hams were all cured. (Table, 12, 13, 31, 80, 192, 257, 355, 376, 377, 403, 543.) In 10 the ligature was used, and 1 was cured by pressure.

Their occupations were—2 foot-soldiers, a pipemaker, barge-man, mealman, orange-porter, shoemaker, and baker. In 3 cases the occupation is not stated, but one of these men had carried five hundredweight for wagers.

Ages.—25, 28, 32, 32, 33, 33, 36, 38, 38, 53; one is not given.

The symptoms resulting from this aneurism vary much in different cases. A sensation as of stabbing, snapping, or of something giving way in the ham, is frequently felt by the patient, and this generally when making exertion, especially during sudden extension of the leg. Sometimes the pulsatory movement first attracts the patient's attention; in other cases, weakness, pain, stiffness, or swelling are first observed. Pains are often present in the thigh, foot, and calf of the leg, and

may be of a darting, cramp-like, or of a dull aching character ; this depending on the size and situation of the tumour and the nerves pressed upon. In some cases the leg and foot are much swollen, in consequence of obstruction to the return of the venous blood. A bellows-sound can generally be heard over the tumour. Occasionally large popliteal aneurisms have existed for a long time without causing much inconvenience : the case mentioned at page 177 is an extraordinary instance of this.

Although popliteal aneurism is, in the great majority of cases, easy of detection, it may occasionally, when diffused and of large size, give rise to much difficulty in the diagnosis. The three following cases, which occurred in St. Thomas's Hospital, are good illustrations of this. Mr. Travers, senior, has kindly furnished me with the notes of the first ; for the history of the second case I am indebted to my friend Mr. W. Adams ; and the subject of the third is now in the hospital. The first two cases should perhaps have been inserted in the chapter on Rupture of the Arteries ; but as they are of great practical importance as regards the diagnosis of popliteal aneurism, I think that they will not be considered out of place.

CASE I.

"H. R. D., æt. 45, exsanguineous appearance, was admitted into St. Thomas's Hospital, under Mr. Travers, with a large swelling of the lower three fifths of the right thigh ; most considerable on the inner side, very much discoloured, rising at each side above the level of the bone, as if confined by the attachments of the fascia. At the upper and inner part of the swelling were two small openings discharging a sanious fluid ; the foot and leg were œdematous with desquamation of the cuticle. He stated that he had been engaged mowing grass with unsound shoes, which had caused his foot and leg to inflame ; that a number of red spots appeared on his legs : a few days after this, while sitting in his chair before the fire, he felt something give way, and he had the sensation of a trickling down the thigh, and should have fallen to the ground but for immediate support. This was about nine weeks since. He is certain the swelling began from below and extended

upwards, but is not clear as to whether the leg or thigh swelled first. There is at present no fluctuation in the tumour, but a degree of elasticity sufficient to throw considerable doubt on the nature of the case,—some supposing it an abscess following erysipelas; others, diffused aneurism of the femoral artery; others a fungoid tumour. A probe, introduced at one of the openings, passed freely in every direction, and when withdrawn was followed by a sanious discharge. The man's appearance would lead to the belief that he had lost a large quantity of blood.

On the second day after his admission, about a pint of blood escaped from one of the openings of the tumour, which led to the determination of operating immediately.

September 3d. A scalpel was plunged into the tumour, and an incision made, from which grumous blood only escaped. The finger introduced, passed readily in every direction. Amputation was therefore resolved upon, and while the artery at the groin was commanded by pressure, flaps were formed from the opposite sides of the thigh and the bone sawn through immediately below the trochanter minor. The flaps when brought together formed an even line for union from above downward, of about eight inches in length.

The tumour was found to consist of coagulated blood diffused among the muscles beneath the fascia. In one part suppuration had commenced. In the centre of the popliteal space, was an opening in the artery half an inch in length, of an oval shape, the edges being rounded off by ulceration.

7th. The wound partially dressed; upper third united by adhesion; healthy suppuration in moderate quantity.

14th. The two lower ligatures came away; health improving.

18th. Last ligature came away.

28th. Wound rather indolent though it has made much progress in healing; ordered quinine, mutton chops, and porter.

October 3d. Cicatrization nearly completed.

15th. Left the hospital with a wooden leg quite well.

From his wife, who came to visit Durrant the day following the operation, it was ascertained that while sitting in his chair during the inflammation of his leg before mentioned, he had suddenly cried out, turned pale, and fainted: at the same

time the thigh swelled enormously and beat very quickly: after continuing three or four days the pulsation ceased, while the swelling increased from day to day."

CASE II.

"G. L., æt. 33, rather tall, light hair, pale, sallow complexion, and considerably emaciated. Has been in the silk trade. Admitted February 16th, 1841, under Mr. Green.

Present symptoms.—The right knee-joint is uniformly swollen, being almost half as large again as the left, the skin very tense, and of its natural colour over the anterior and lateral parts; but of a dark, livid, and in patches almost of a black appearance in the popliteal region, where the prominence is greatest; the swelling is elastic to the touch, and seems distinctly to convey the idea of fluctuation (no pulsation could be felt); it extends to four or five inches above the knee-joint; beyond this the thigh is much emaciated and considerably smaller than the opposite limb; the leg is flexed, and he has the power of extension; says he has lost all feeling from the knee downwards, for the last month; the leg seems perfectly dead to himself, but if pinched, he has sensation, though considerably impaired; the leg and foot are œdematous; the skin tense, but of its natural colour; he complains of a dull aching pain in the neighbourhood of, and above the knee-joint, which disturbs his sleep; this is constant, but at times becomes excruciating, throwing him into profuse perspirations, from the effect of which, combined with the pain, want of rest, and general constitutional irritation, he has been gradually losing flesh.

History.—Has of late become much reduced in circumstances, from having led a gay and dissipated life; but always enjoyed good health until attacked with the present complaint. In the beginning of September last, five months since, he had frequent pains about the right ankle-joint; the foot and ankle then began to swell; could not assign any cause for this; but considered it of rheumatic origin; the swelling continued to increase up the leg, the pain continuing. In the beginning of December, the parts at the back of the knee began to contract so as to prevent his straightening the leg. Soon after

this he perceived a swelling at the back part of the knee, a few days after which the whole knee became much swollen, the back part being harder than the rest. The pain was often very severe. Has had no shivering fits; no pulsation has ever been observed. Previous to admission into the hospital he had been under the care of a medical man.

Diagnosis.—Mr. Green considered the disease to be of a fungoid character. Mr. Mackmurdo was of opinion that it was a chronic abscess. It was not considered to present any of the usual characters of aneurism.

Treatment. Ordered. Pot. Iodid. gr. iv; Infus. Gent. c. ʒiiss; Syr. Papav. ʒj, ter die. Bread-poultice to the knee.

April 3d. Since he has been in the hospital the swelling on both sides of the knee has very considerably diminished; but the prominence at the back part remains as large as ever, though it diminished slightly a few weeks ago. The leg has been gradually getting harder for the last three weeks; it is now exceedingly hard, and the skin very tense, but of its natural colour; the sides of the knee are also very hard and unyielding. There is a superficial ulcer as large as a shilling on the outer ankle, which discharges freely.

9th. A large vesication appeared under the knee, which burst and discharged a quantity of clear fluid.

16th. In the under part of the tumour, a small swelling was perceived, in which Mr. Solly made an opening, and a small quantity of dark bloody matter escaped; a few hours afterwards hemorrhage came on, but was stopped by pressure before any considerable quantity of blood was lost. A second hemorrhage took place on the 19th, but was commanded by pressure; a third, and very copious hemorrhage, took place during the night of the 22d, without the patient being aware of it, and in the morning his bed was found to be saturated with blood, which was now dropping on to the floor; pressure was made, but repeated syncope came on, and he died at 9 a. m., on the 23d of April. A post-mortem examination showed the tumour to be a false aneurism; the sac, which was formed by the condensed surrounding tissues, was extremely thick, and contained numerous concentric layers of fibrine and coagulated blood in all its different stages. The artery presented a small, irregular, lacerated opening about

the centre of the popliteal space. No record was kept of the inspection of the viscera."

CASE III.

S. L., an agricultural labourer, æt. 37, was admitted into St. Thomas's Hospital, September 14th, 1846, under the care of Mr. Mackmurdo, in consequence of an enormous swelling in the left knee, occupying the ham and inner part of the joint.

Sept. 15th. The swelling is slightly elastic, the integuments a little discoloured, but the surface is smooth; the leg is flexed on the thigh, and the foot and ankle œdematous. No bruit can be heard, and the femoral artery above the swelling appears to be healthy. The patient gives the following account of himself: he has been generally healthy, and believes that he never took mercury. About twelve months since he received a blow on the fore part of the knee; this gave rise to pain for a short time, but it gradually subsided; he also states that on one occasion whilst walking, he suddenly felt something give way in the ham, and his knee became at once stiff and painful. Eight months after this he observed a swelling, about the size of a small orange, in the ham; there was no pulsatory movement in it when first noticed, but afterwards pulsation was very evident; the tumour increased very rapidly, and pulsation ceased. A lancet had been introduced by a surgeon in the country, and a small teacupful of blood followed the puncture; the wounds closed, and no inconvenience appeared to result from the operation. Mr. Mackmurdo also made two exploratory punctures with a grooved needle, but only a small quantity of dark coloured blood was discharged. It was thought to be fungus hæmatodes by Messrs. Green, Mackmurdo, and Solly, although the nature of the disease was considered doubtful.

Sept. 18th. On the evening of the 15th a sudden increase took place in the swelling, it became very painful, and has remained so ever since; the integuments have a blueish appearance, are thin and tense, and a small quantity of yellowish serum oozes from the openings made by the needles. The circumference of the limb above the knee is now two feet; the surface very hot; no pulsation nor abnormal sound is

present, and the man, who on Wednesday said "he should be sorry to have his leg off," is now anxious to have something done to relieve his sufferings; the pain is of a very acute character.

Mr. Green thinks that the disease is fungus hæmatodes, and that amputation is not justifiable, and Messrs. Mackmurdo and Grainger are of the same opinion.

Messrs. South, Travers, and others, incline to the opinion of its being aneurism, and think that under any circumstances the limb should be removed.

Sept. 20th. Is now suffering less pain than on Saturday, but he has taken a grain of morphia twice daily, and hemlock poultice has been applied. Pulse quick and feeble; countenance anxious.

Sept. 22d. Bleeding took place from the wound made by the first puncture, but not to a large extent; the swelling suddenly increased; the pain very great, pulse 146, countenance anxious.

Sept. 23d. It was now thought advisable not to recommend amputation, but if the patient desired it the leg was to be taken off. In the evening, at the patient's earnest request, Mr. Solly amputated at the upper part of the thigh. Very little blood was lost, but the man was so faint that it was thought proper to keep him on the table for five or six hours.

Sept. 24th. Better than yesterday, but the symptoms are very unpromising. I examined the leg with Mr. Adams. A large mass of imperfect and irregularly formed coagulum composed the greater part of the swelling; the blood had completely dissected the thigh bone from the surrounding muscles. An abscess about the size of a small apple, and containing sero-purulent matter, had formed at the lower part of the tumour. The femoral artery from above could be traced into an aneurismal sac as big as a pigeon's egg, and seated close to the perforation in the triceps. The artery was nearly impervious, but water injected into it passed into the sac. The sac, at the anterior and lower part, was imperfect, but the aperture did not appear to be of recent origin. The distal end of the artery was seen three or four inches below the sac, the separation probably being occasioned by the effused blood.

25th. Better ; large quantities of brandy, wine, and opium have been given, the pulse is now reduced to 124.

26th. Has been very delirious during the night, and it was thought necessary to confine his hands, as he attempted to strangle himself ; this excitement was supposed to be occasioned by the opium. Pulse 120. Countenance better. The stump dressed ; no union by the first intention, but it looks better than could have been expected under the circumstances. The brandy and opium to be continued with all the nourishment he can take.

28th. Better ; to take all the nourishment he can, with wine and brandy.

30th. Improving, pulse less frequent, countenance better ; stump looking well.

Oct. 2d. Better. Continue the nourishment.

4th. Improving.

16th. Great discharge from the stump, diarrhœa came on yesterday morning and continued for some time ; the man is much reduced in strength, pulse 120. On the right side of the neck above the clavicle there is a pulsatory movement, which was first observed a few days since ; on applying the stethoscope a rough bruit is heard, and the pulsation is very distinct externally.

19th. Pulse 120, bowels irritable, countenance anxious. It is thought by some who have examined the chest that there is aneurism of the innominata, or arch of the aorta.

24th. The pulsatory movement and bruit have disappeared, but he is gradually losing strength, and his symptoms are altogether less favorable.

29th. Much in the same state as on the 24th.

31st. Is gradually getting weaker.

Nov. 3d. Is rather better than at the last report, although the sickness is very troublesome, and his appetite bad.

12th. Is improving in health, but a few days since an aneurism about the size of a walnut was discovered in the other femoral artery, just before it perforates the triceps. The pulsation in the tumour is very strong, and a slight bruit is heard.

27th. The aneurism last mentioned (although nothing has been done for it) has become much reduced in size, it is now not much larger than an almond shell, and about the same shape.

The throbbing is less violent; the stump nearly healed, and the man's health greatly improved.

Jan. 19th 1847. Much the same as at the last report, his appetite is good, and he takes large quantities of nourishment; the stump is not quite healed. There is now only a slight thickening in the situation of the femoral aneurism.

The three cases just related all possess features of more than ordinary interest, and are replete with practical information; the last case is one of the most remarkable of the kind that I have met with.

This man was reduced to the lowest extremity of weakness, and there scarcely appeared a possibility of his recovery. For a long time he took sixteen ounces of brandy and half a pint of wine daily, besides the most nourishing diet that could be obtained for him. The most extraordinary circumstance connected with the case is the disappearance of the femoral aneurism. Some of my readers may perhaps be inclined to doubt the existence of aneurism in this case in the femoral artery. Those who examined the tumour, however, were all satisfied that it was an aneurismal dilatation; indeed the sudden increase of the size of the artery, which could be so readily felt in consequence of the man's emaciated condition, and the violent throbbing at this part, could, I think, leave no doubt as to the nature of the disease.

It is difficult to understand by what means this tumour was so quickly reduced in size. Did the arterial coats at this part, from want of tone, dilate and afterwards regain their former tonicity? And was the preternatural pulsation observed, in the situation of the innominata, occasioned by the same cause?

Posterior tibial.—Two examples only of aneurism of this artery are mentioned in the Table (206, 520), but it is possible that in a few cases the disease in this vessel is included amongst the popliteal aneurisms.

Spontaneous aneurisms may occur in the smaller arteries, such as the anterior tibial, temporal (509), and maxillary, but they are unfrequent.

CHAPTER XX.

TABLE OF 551 SPONTANEOUS ANEURISMS (SO CALLED) SELECTED
INDISCRIMINATELY FROM THE BRITISH MEDICAL AND SURGICAL
JOURNALS, FROM THE YEAR 1785 TO THE PRESENT TIME.

[When s. is used after the operation it denotes a successful termination.]

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Transactions of a Society for the Improvement of Med. and Chir. Knowledge, vol. i.	1 M.	45	Popliteal	Coachman . .	Femoral tied successfully below its middle. Four ligatures used, but not much tightened. J. Hunter's first operation of tying the artery at some distance above the sac. 1785	John Hunter, St. George's Hospital.
	2 M.	40	Popliteal	Trooper . . .	One ligature passed round the artery and vein ; it came away on the 14th day—after this hemorrhage—the artery tied higher up. Death from hemorrhage on the 26th day from the first operation	John Hunter.
	3 M.	35	Popliteal	Postilion . .	Femoral tied s. one ligature	John Hunter.
	4 M.	36	Popliteal	Coachman . .	Femoral tied s. one ligature	John Hunter.
	5 M.	42	Lt. Popliteal		Femoral tied s. one ligature	John Hunter.
	6 M.		Femoral		Spontaneous cure	Mr. E. Home.
	7 M.	25	Popliteal	Hackney-coachman .	Femoral tied s. broad ligature	Mr. Lynn, Westminster Hospital.
	8 M.	43	Rt. Femoral in the groin	Negro. Blow on the thigh .	Femoral tied below Poupart's ligament ; sac burst on the 11th day ; death from hemorrhage. The profunda rather less than half an inch above the ligature	Mr. Birch, St. Thomas's Hospital.
	9 M.		Popliteal		Femoral tied—pulsation in the sac 2d day — amputation (double ligature)	Mr. Pott, St. Bartholomew's.
	*10 M.		Popliteal	Sailor	Femoral tied, death from fever on the 9th day (double tape)	Mr. Cline, St. Thomas's.
	11 M.	50	Lt. Popliteal	Fall from a scaffold	Femoral tied s. . . .	Mr. Earle, St. Bartholomew's.

* The above 10 cases are reported by Mr. E. Home.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Transactions of a Society for the Improvement of Med. and Chir. Knowledge, vol. ii.	12	M. 33	Both Popliteal	Pipemaker. Often drank eight or ten pints of water in the day, and walked 16 or 17 miles	Right Femoral tied s.	Mr. E. Home.
	13	M. 32	Both Popliteal	Foot-soldier. Wore tight leather breeches and walked 10 miles in them	Left leg amputated. Right femoral tied s.	Mr. J. Harris.
	14	M.	Popliteal	Dragoon . .	Femoral tied s.	Mr. E. Home.
	15	M. 45	Lt. Popliteal	Butler. Hard drinker	Femoral tied s.	Mr. Knight.
	16	M. 50	Popliteal	Gentleman. Free liver	Femoral tied; death on the 12th day from hemorrhage—artery diseased	Mr. E. Home.
	17	M. 32	Rt. Popliteal	Blacksmith .	Refused to be operated upon—sac burst—great loss of blood, spontaneous cure	Mr. Wilson.
	18	F. 69	Both Carotids within the skull	Lady. Insane. Giddiness, headache, imperfect vision	Probably serous effusion into the ventricles	Sir G. Blane.
	19	M. 34	Ascending Aorta	Sailor	Burst into the œsophagus . .	Dr. Wells.
Vol. iii.	20	M. 35	Ascending Aorta	Merchant . .	Sac communicated with the pulmonary artery	Dr. Wells.
Med. Chirur. Transact. 1809. Vol. i.	21	F. 44	Common Carotid		Carotid tied—two ligatures—death on the 22d day from inflammation of the sac. Left arm and leg paralytic on the 8th day. 1802. The first ligature of the carotid for aneurism	Sir A. Cooper.
Vol. ii.	22	M. 50	Lt. internal Carotid	Porter. Employed in carrying loads of iron upon the shoulders, a collar of wood being placed round the neck	Common carotid tied s. Two ligatures, needle passed through the artery above and below. The man returned to his work	Sir A. Cooper.
Vol. iii.	23	M. 43	Descending Thoracic	Carpenter. Dysphagia	Burst into the œsophagus . .	Mr. Armiger.
	24	F.	Gluteal	No cause assigned. Necessity	Internal iliac tied s. 1812. The first operation of this kind	Mr. Stevens.
Vol. vii.	25	M. 39	Popliteal and Thoracic arch	Soldier . . .	Femoral tied s. Died two months afterwards of aortic aneurism	Mr. Crampton.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Med. Chirur. Transact. Vol. vii.	26 M.	26	Popliteal	Robust . . .	Femoral tied s. . . .	Mr. Dease.
	27 M.	56	Rt. External Iliac	Smith. Muscular. Twisted the rt. knee, and afterwards felt pain in the groin	External iliac tied s. . . .	Mr. Soden.
Vol. x.	28 M.	52	Rt. Carotid	Glass-cutter. Beaten about the right side of the head	Common carotid tied—the man in a state of ptyalism a few days before. Death on the 34th day, probably from inflammation of the artery	Mr. Vincent.
	29 M.	50	Rt. Femoral near the groin	Twenty years a coachman	External iliac tied s. . . .	Mr. Norman, Bath.
	30 M.	50	Rt. Femoral near the groin	Sailor	External iliac tied s. . . .	Mr. Norman.
	31 M.	36	Both Popliteal	Bargeman . .	Both femoral arteries tied s. In good health ten years after the operations	Mr. Norman.
	32 M.	38	Rt. Popliteal	Workhouse pauper	Femoral tied s. . . .	Mr. Norman.
Vol. xi.	33 M.	36	Lt. Carotid	Fish - porter. Carried heavy baskets of fish on the left shoulder	Carotid tied s. . . .	Mr. Lyford.
	34 M.	32	Popliteal	Sailor	Femoral tied s. . . .	Mr. Roberts.
	35 M.	41	Lt. Carotid	Sawyer . . .	Carotid tied; death ten weeks after from frequent bleedings	Mr. Coates.
	36 M.	29	Femoral at the groin	Foot-soldier .	External iliac tied s. . . .	Mr. Salmon.
Vol. xii.	37 M.	38	Lt. Axillary	Fisherman . .	Subclavian tied—hemorrhage. Death on the 12th day	Mr. Mayo.
	38 M.	35	Lt. Axillary	Cooper—blow from a rope	Subclavian tied s. . . .	Mr. Gibbs.
Vol. xiii.	39 M.	36	Rt. Axillary	Tide-waiter. Felt something snap 6 weeks before while making sudden exertion of the right arm	Subclavian tied s. . . .	Mr. Key.
	40 F.	75	Rt. Carotid	After violent fit of coughing	Carotid tied on the distal side. Reported cure	Mr. Wardrop.
Vol. xvi.	41 M.	30	Rt. External Iliac	Foot-soldier .	Common iliac tied—death on the eighth day from hemorrhage—catgut ligature	Dr. Crampton.
	42 M.	48	Rt. Popliteal (diffused)	Organ-builder. Gouty habit.	Femoral tied.—Gangrene. The leg amputated—recovery	Mr. S. Cooper.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Med. Chirur. Transact. Vol. xvi.	43 M.	38	Descend- ing Tho- racic	.....	Opened into the œsophagus eight weeks before death	Dr. Pinkard.
	44 M.	46	Rt. Axillary	Fisherman. 13 weeks be- fore had his arms for a long time in sea water	Subclavian tied s. Ligature came away on the 85th day	Mr. Crossing.
	45 M.	49	Lt. Axillary	Groom . . .	Subclavian tied s. . . .	Mr. C. Mayo.
Vol. xx.	46 M.	36	Abdominal Aorta	Sailor—sac very large	Burst behind the peritoneum	Sir D. Dixon.
Vol. xxi.	47 M.	23	Rt. Popli- teal	Wine-porter. In the habit of lifting heavy weights	Femoral tied—amputation. Ex- ternal iliac tied—recovery	Mr. Hadwen.
Vol. xxii.	48 M.	20	Orbital . .	Sailor. Con- cussion of the brain 8 months before	Carotid tied s. . . .	Mr. Busk.
Vol. xxiii.	49 M.	55	Innominat.	A sailor . . .	Carotid and subclavian arteries tied—death eighteen weeks after from bursting of the sac	Mr. Wickham.
Vol. xxiv.	50 F.	24	Superior mesenteric	.....	Jaundice	Dr. Wilson.
	51 M.	42	Superior mesenteric	Coachman. Hæmoptysis	Not stated	Dr. Wilson.
Vol. xxv.	52 M.	31	Ascending Aorta	Surgeon . . .	Burst into the right ventricle	Mr. Beck.
Vol. xxvii.	53 M.		Lt. Exter- nal Iliac	.....	Common iliac tied s. Double ligature of staymaker's silk came away on the 28th day	Mr. Hey.
	54 M.	37	Aorta, tho- racic and abdominal	Gentleman. Free liver	Dissecting the coats of the tho- racic and abdominal aorta as well as the branches from the arch—burst into the pericar- dium	Dr. Todd.
Vol. xxviii.	55 M.	27	Rt. Popli- teal	Foot-soldier .	Cured by pressure—instrument applied; nine days after pul- sation ceased	Mr. Greatrex.
	56 M.	60	Ascending Aorta	No pulsation or abnormal sound	Sac entire; cause of death not stated	Dr. Barker.
	57 M.	35	Descend- ing Aorta and Right Renal	Labourer. No abnormal sound or pul- sation	Burst into the cellular mem- brane around the kidney	Dr. Barker.
Medical and Phys. Journ. vol. i, 1802.	58 M.	27	Popliteal	Rope-maker .	Femoral tied s. Two ligatures used	Sir A. Cooper.
	59 M.	29	Rt. Popli- teal	Farmer's ser- vant, healthy	Femoral tied s. Two ligatures	Sir A. Cooper.
Vol. ii.	60 M.	34	Ascending Aorta and Arch	Soldier, after- wards car- penter. Kick from a horse	Sac burst externally . . .	Dr. Moodie.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Medical and Phys. Journ. vol. xvii.	61 M.		Rt. Popliteal	Felt acute pain when swimming	Femoral tied s. Two ligatures	Dr. Andrews.
	62 M.		Popliteal	Sailor. Felt something snap whilst heaving the anchor	Femoral tied. Two ligatures—ulceration of sac—warm milk injected—bleeding, amputation—death	Deal Naval Hospital, 1807.
Vol. xx.	63 M.		Popliteal & Ascending Aorta	.....	The man died as soon as the integumental incision was made, from the bursting of the aortic aneurism	Sir A. Cooper, Guy's Hospital
Vol. xii.	64 F.	30	Ascending Aorta	Tumour appeared on the right of the sternum and afterwards disappeared	Burst into the pericardium . .	Dr. Rodman.
Vol. xviii.	65 M.	40	Femoral . . . . .	.....	Femoral tied s.	Mr. Tompkinson.
Vol. xxv.	66 M.	48	Popliteal.	Marine . . .	Femoral tied s. Double ligature	Dr. C. Hutchinson.
	67 M.	32	Popliteal.	Sailor	Femoral tied s. Double ligature	Dr. C. Hutchinson.
Vol. xxxiii.	68 M.	39	Ascending Aorta and Arch	Colonel in the army. Supposed to have been chronic croup	Pressure on the trachea—sac entire	Dr. Haxby.
	69 M.	32	Lt. Subclavian	Ropemaker .	Cured by pressure and Valsalva's treatment after eighteen months	Mr. Yeatman.
Vol. xli.	70 M.	31	Rt. Femoral, (upper third)	Soldier . . .	External iliac tied s. . . .	Mr. Bond.
Vol. lvi.	71 M.	42	Lt. Popliteal	Negro. Very muscular	Femoral tied—pulsation ceased on the 3d day—death on the 5th day from the shock of the operation. The femoral below the profunda divided into two equal branches	Sir C. Bell.
Vol. lv.	72 M.	34	Lt. Popliteal and Ascending Thoracic	Brickmaker. Bones of the leg fractured some years before	Femoral tied s. Rupture of the (small) aortic aneurism six weeks after the operation	Mr. Arnott.
	73 M.	50	Lt. Popliteal	Servant . . .	Femoral tied. Two ligatures used—suppuration of the sac—cure	Mr. Benza.
	74 M.	37	Descending Thoracic	Soldier. Hæmoptysis	Burst into the right pleura . .	Mr. Manyard.
Vol. lvii.	75 M.	30	Rt. Popliteal	.....	Supposed spontaneous cure	Mr. Travers, St. Thomas's Hospital.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Medical and Phys. Journ. vol. lvii.	76 M.	57	Lt. Axillary	Labourer . .	Subclavian tied—death 5½ days after the operation. Gangrenous appearance of the hands and legs	Sir B. Brodie.
	77 M.	28	Rt. Popliteal and Ascending Thoracic	Brass-founder. Turned a large wheel with the right foot	Femoral tied s. Death two years after from bursting of the aortic aneurism	Mr. Simpson.
	78 M.	30	Popliteal	Sailor . . .	Femoral tied s.	Mr. Travers, St. Thomas's.
	79 M.	73	Rt. Subclavian	Labourer . .	Subclavian tied. Sac perforated by the needle—death on the 2d day— inflammation of the right pleura	Mr. Travers.
Vol. lviii.	80 M.	25	Both Popliteal	Mealman. Accustomed to carry sacks of flour	Both femorals tied s. Interval of four months	Mr. Travers.
	81 F.	48	Ascending Aorta		Burst externally	Mr. Rainy.
	82 M.		Ascending Aorta	Soldier . . .	Burst into the pericardium . .	Mr. Rose.
	83 M.	40	Ascending Aorta	Gentleman .	Burst into the pericardium . .	Dr. Hewett.
	84 M.	37	Descending Thoracic	Gardener . .	Burst into the œsophagus . .	Dr. Young.
Vol. lix.	85 M.	72	Rt. Femoral (diffused)	Sac punctured by another surgeon	Amputation. Death on the 7th day	Mr. Guthrie.
Vol. lxiii.	86 M.	53	Innominate and right Subclavian	A soldier. Bel-lows-sound	Serous effusion into the pleuræ. Sac entire	Dr. Robinson.
	87 F.	28	Aortic arch	Very passionate. Took violent exercise	Burst into anterior mediastinum	Dr. Thompson.
Vol. lxvii.	88 M.	42	Lt. Femoral (upper 3d)	Sailor. When at the pumps felt as if the limb had been taken off by a shot	External Iliac tied s.	Mr. B. Cooper, Guy's Hospital.
	89 M.	28	Ilio-femoral		External Iliac tied s.	Mr. Guthrie.
London Medical Repository, vol. i.	90 M.	27	Rt. Popliteal		Femoral tied. Death on the 23d day from tetanus	Mr. Dickinson.
Vol. v.	91 M.	40	Aortic arch	Soldier. Intemperate—wrestler—felt no inconvenience until ten days before his death	Burst into the trachea.	Mr. Newbolt.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.	
London Medical Repository, vol. vii.	92	M.	26	Abdominal Aorta	Mistaken for tubercles	Sac held a quart	The Editors.
Vol. xiii.	93	M.	29	Rt. Femoral (at the groin)	Infantry-soldier	External iliac tied s. He performed his usual duties afterwards	Mr. Cole.
Vol. xx.	94	M.	60	Rt. Axillary	Sailor	Axillary tied s. Suppuration of the sac	Mr. Bullen.
	95	M.	56	Aortic arch	Gardener	Sac burst externally	Mr. Ward.
	96	F.	23	Aortic arch and Abdominal Aorta	Dysphagia, Dyspnœa	Pressure on the trachea. The sides of this tube nearly approximated	Mr. Ward.
	97	M.	34	Aortic arch	Dyspnœa, Dysphagia	Pressure on the trachea	Mr. Ward.
	98	M.	31	Aortic arch		Rupture into the œsophagus	Mr. Ward.
Vol. xxi.	99	M.	46	Ascending Aorta		Hæmoptysis. Sac perfect.	Mr. Hunter.
Vol. xxix.	100	M.	41	Ascending Aorta	Frame-work knitter	Rupture into the right pleura	Mr. Attenburrow.
	101	M.	42	Thoracic Aorta, Lt. Femoral, and Popliteal		External iliac tied s. Death seven months after from the bursting of the thoracic aneurism	Mr. Wright, Nottingham.
	102	M.	38	Rt. Popliteal	Blacksmith	Femoral tied s.	Mr. Wright.
Edinburgh Medical and Surgical Journ. vol. iii, 1804.	103	F.	40	Femoral (at the groin)	Intemperate	External iliac tied s. Double ligature	Mr. Abernethy.
	104	M.	54	Popliteal	Porter. Blow on the ham seven months before	Femoral tied s. Double ligature	Mr. Dawson.
Vol. viii.	105	M.	41	Rt. Femoral (upper 3d)	Baker. Used to carry heavy weights up stairs	External iliac tied s. Double ligature	Mr. Goodlad.
Vol. xi.	106	M.	33	Rt. Subclavian	Labourer. Often pushed a heavy car with the right shoulder	Subclavian tied. Death on the 8th day probably from irritation	Mr. Collis.
	107	M.	55	Rt. Subclavian	Soldier.	Refused to be operated upon. Death from suppuration and irritation	Mr. Collis.
	108	M.	48	Rt. Subclavian	Clergyman	Subclavian tied. Death on the 4th day—approaching mortification of the arm	Mr. Collis.
	109	M.	38	Rt. Femoral	Whitesmith	Femoral tied high up. Sloughing of the sac—convalescent two months after	Mr. Mackesey, Palermo.
	110	M.	50	Rt. Femoral (at the groin)	Brazier. Felt something give way when lifting a heavy boiler	External iliac tied s.	Mr. Mackesey.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Edinburgh 111 Medical and Surg. Journ. Vol. xii.	M.	38	Rt. Carotid	Negro	Sac burst. No operation	Mr. Duncan.
112	M.	30	Rt. Femoral and Popliteal		External iliac tied s. . . .	Mr. Newbigging.
Vol. xiii. 113	M.	38	Rt. Femoral (upper 3d)	Sailor. After working hard, suddenly seized with pain in the groin	External iliac tied s. Two ligatures.	Dr. Robertson.
114	M.	34	Descending Thoracic	Soldier. Bassoon player	Burst into the right pleura	Dr. Pearson.
Vol. xvi. 115	M.	16	Subscapular	Fall on the shoulder. Punctured by another surgeon. Sac covered with a bony deposit	Sac removed. Subscapular and other arteries tied—death some time after the operation	Mr. Liston.
116	M.	35	Rt. Popliteal	Sailor. Sprain in lifting a heavy cask	Femoral tied s. . . .	Mr. Liston.
117	M.	35	Lt. Axillary	Coachman. Fell violently on the left shoulder	Subclavian tied s. . . .	Mr. Liston.
118	M.	30	Lt. Popliteal	Strain in carrying a heavy weight up stairs	Femoral tied s. . . .	Mr. Liston.
Vol. xvi. 119	M.	35	Lt. Femoral (upper 3d)		External iliac tied s. . . .	Mr. Liston.
Vol. xvii. 120	M.	40	Innominate	Dysphagia, Dyspnoea	Pressure on the trachea . . .	Dr. Whiting.
Vol. xviii. 121	M.	30	Lt. Popliteal	Infantry-soldier. Hindoo	Femoral tied s. . . .	Dr. Adam.
Vol. xxi. 122	M.	45	Lt. Subclavian	Porter	Subclavian tied s. . . .	Mr. Wishart.
Vol. xxii. 123	M.	39	Descending Thoracic	Tumour in the back	Rupture into the left pleura	Mr. Proudfoot.
Vol. xxvi. 124	M.	54	Both Femoral (in the groins)	Trooper in the Scotch Greys 21 years, afterwards a carter. Struck with the edge of a cask on the right groin, and with the shaft of a cart on the left	Both external iliac arteries tied s. Interval, eleven months	Mr. Tait.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Edinburgh Medical and Surg. Journ. Vol. xxvii.	125 M.	35	Rt. Femoral	.....	Femoral tied s. Pulsation in the sac, after the operation, removed by methodical bandaging	Mr. Liston.
	126 M.	40	Lt. Popliteal	.....	Femoral tied. Gangrene of the foot—amputation—recovery	Mr. Liston.
	127 M.	43	Rt. Axillary	Fall on the ice	Subclavian tied. Death on the 13th day from hemorrhage	Mr. Liston.
Vol. xxxvi.	128 M.	22	Abdominal Aorta	Edema of the lower extremities	Communicated with the cava above its bifurcation	Mr. Syme.
	129 M.	37	Femoral at the groin and Popliteal	Sailor. Fell down a hatchway	External iliac tied s.	Mr. Ewing.
	130 M.	60	Rt. Axillary	Intemperate	Subclavian tied s.	Mr. Fergusson.
Vol. xliii.	131 F.	65	Aortic arch	.....	Cause of death not evident	Dr. Gardener.
	132 M.	40	Descending Thoracic (two aneurisms)	Gentleman. Dyspnœa, Dysphagia	Burst into the left bronchus	Dr. Gardener.
Vol. xlv.	133 M.	38	Rt. Subclavian	.....	Subclavian tied s.	Dr. Hobart.
	134 M.	60	Lt. Subclavian	Weaver	Subclavian tied. Died apoplectic eight hours after	Dr. Auchincloss.
Vol. xlv.	135 M.	64	Innominate. Rt. Subclavian & Carotid	.....	No operation	Dr. Auchincloss.
	136 M.	60	Ascending Aorta	.....	Serous effusion into the right Pleura	Dr. Henderson.
Vol. xlvi.	137 M.	30	Popliteal	Porter. Slipped off a plank	Femoral tied s.	Mr. Syme.
	138 M.	51	Popliteal	Groom. Strain 3 months before	Femoral tied s.	Mr. Syme.
	139 M.		Popliteal	.....	Femoral tied, death from gangrene of the leg	Mr. Turner.
Vol. xlv.	140 M.	50	Ascending Aorta and Arch	Excessive Dyspnœa	Death without rupture of the sac. Hydropericardium	Dr. Shortt.
	141 M.	45	Ascending Aorta	.....	Pressure on right bronchus. Serous effusion into the Pleura	Dr. Shortt.
	142 M.	30	Ascending Aorta	.....	Sac opened into pulmonary artery	Dr. Henderson.
Vol. L.	143 M.	42	Lt. Femoral (at the groin)	Musician	External iliac tied s.	Dr. Hobart.
	144 M.	31	Rt. Femoral (at the groin)	Tailor	External iliac tied—gangrene—amputation—death on the 6th day	Mr. Syme.
Vol. liii.	145 M.	35	Ascending Aorta	Tinsmith. Intemperate	Burst into right auricle	Dr. Peebles.
	146 M.	36	Ascending Aorta	Intemperate	Burst into pulmonary artery	Dr. Allison.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Edinburgh Med. & Surg. Journ. Vol. liii.	147	M. 60	Aortic arch	.....	Burst into a branch of pulmonary artery	Dr. Grayham.
	148	M. 31	Ascending Aorta	Mason . .	Burst externally . .	Dr. Shortt.
	149	M. 27	Abdominal Aorta	.....	Burst into the peritoneum .	Dr. Chisholm.
Vol. liv.	150	M. 52	Abdominal Aorta, lower part.	.....	Burst into the inferior cava	Dr. Reid.
	151	M. 56	Ascending Aorta and Arch	Gentleman. (Edema of the chest . .	Sac opened into the superior cava	Dr. Young.
Vol. lvii.	152	M. 15	Internal Carotid & Basilar	Shoemaker. Hemiplegia and Encephalitis	Serous effusion into the ventricles	Dr. Kingston.
Vol. lix.	153	M. 45	Aortic arch	Sailor	Rupture into the right pleura	Sir D. Dixon.
Vol. lx.	154	F. 56	Ascending Aorta	Intemperate. Asthmatic	Rupture into the pericardium—dissecting	Dr. B. Peacock
	155	F. 84	Ascending Aorta	.....	Rupture into the pericardium—dissecting	Dr. B. Peacock
Vol. lxii.	156	F. 30	Rt. Carotid	.....	Carotid tied—asphyxia—tracheotomy—death on the 16th day. Rupture of the sac	Dr. Duncan.
Edinburgh Journ. of Med. Science. Vol. i.	157	M. 39	Rt. Popliteal	Cowkeeper .	Femoral tied s. . . .	Mr. Allen.
	158	M. 34	Rt. Popliteal	Cotton-weaver	Femoral tied s. . . .	Mr. Allen.
	159	M. 30	Lt. Popliteal	Sailor	Ulceration of the sac. Amputation—death 8 days after	Mr. Allen.
Vol. ii.	160	F. 40	Rt. Femoral (upper 3d)	Twenty years before, twisted the leg—a small tumour appeared—hard drinker	External iliac tied. Death on the 8th day, without any apparent cause. Mr. Allen thinks it might have arisen from the want of her accustomed stimulus	Mr. Allen.
Vol. iii.	161	M. middle-aged	Abdominal Aorta	.....	.....	Dr. Munroe.
Edinburgh Monthly Journal of Med. Science. Vol. i.	162	M. 36	Popliteal	.....	Kept in bed for 10 days, and the aneurism was cured	Mr. Syme.
	163	M. 26	Lt. Popliteal	.....	Femoral tied s. . . .	Mr. Syme.
	164	M. 29	Rt. Popliteal	Shopkeeper .	Femoral tied s. . . .	Mr. Syme.
	165	M. 39	Ascending Aorta	Vomiting of blood (8 weeks)	Burst into the œsophagus.	Mr. Ure.
	166	M. 46	Lt. Popliteal	Currier. . . .	Femoral tied s. . . .	Mr. Lizars.
Vol. ii.	167	F. 60	Internal Carotid	Lady	Common carotid tied. Death thirty hours after the operation—cause of death doubtful	Mr. Syme.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Edinburgh Monthly Journal of Med. Science. Vol. ii.	168	M. 42	Rt. Popliteal	Plasterer	Femoral tied s.	Mr. Syme.
	169	M. 49	Internal carotid and middle cerebral	Porter. Fall on the head	Extravasation of blood and serum	Dr. A. T. Thompson.
	170	M. 47	Aortic arch		Pressure on the left bronchus. Serous effusion into the pleuræ	Mr. Spittal.
	171	M. 33	Rt. Popliteal	Bargeman Had frequent occasion to leap from the barge	Femoral tied s.	Mr. Syme.
Vol. iii.	172	M. 42	Ascending Aorta	Baker. Subject to rheumatism—dyspnœa	Pressure on the trachea—sac entire	Dr. Henderson
	173	F. 50	Aortic arch	Pulsation observed after a severe domestic affliction	Dysentery. Sac entire . . .	Dr. Henderson
	174	F. 59	Innominate	Subject to rheumatism. Pulse smaller in the right radial	Sac the size of a large pear	Dr. Henderson
	175	F. 42	Ascending Aorta	Acute rheumatism 5 years before. Tumour appeared on the left of the sternum	Syncope. Sac entire . . .	Dr. Henderson
	176	F. 60	Thoracic and Abdominal Aorta	Dropsy and dyspnœa for 3 or 4 months	New channel formed, lined with false membrane. Dissecting	Dr. Henderson
	177	M. 29	Branch of the Pulmonary		Hæmoptysis	Dr. Peacock, P.S.
	178	F. 54	Ascending Aorta		Burst into the pericardium. Dissecting	Dr. Paterson, P.S.
	179	F. 45	Ascending Aorta		Burst into the pericardium . . .	Mr. Spence, P.S.
Glasgow Med. Journ.	180	M. 39	Rt. Carotid		Carotid tied s. Hemorrhage—stopped by compress, &c.	Dr. Perry.
Vol. iv.	181	M. 45	Rt. Femoral (upper 3d)	Butcher. Kick from an ox 6 weeks before	Femoral tied s.	Dr. Perry.
Dublin Journal. Vol. i.	182	M. middle-aged	Aorta		Coagulum as large as a hen's egg, between external and middle coats. No communication with the artery	Dr. Townsend.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Dublin Journal. Vol. i.	183	M. 47	Rt. Subclavian	.....	Dec. 10. Attempted to tie the Innom. but found it diseased. Feb. 9. As well as before the operation.	Mr. Porter.
Vol. ii.	184	M. 63	Lt. Axillary	Labourer . . .	Subclavian tied s. . . .	Mr. Porter.
	185	M. 27	Abdominal Aorta	Intemperate—several courses of mercury. Bellows-sound	Burst behind the peritoneum	Dr. Corrigan.
	186	M. 38	Abdominal Aorta	No bellows-sound when in the erect position	Patient alive when the case was reported	Dr. Corrigan.
	187	F. 58	Aortic arch	Supposed to have been of the Innominata	Serous apoplexy . . .	Dr. M'Farlane.
Vol. iv.	188	M. 26	Thoracic Aorta	Shoemaker. No abnormal sound	Three aneurisms, the largest burst into the cesophagus	Mr. Porter.
	189	M. 26	Aortic arch	Carman. Intemperate—no bruit	Burst into the pericardium . .	Mr. Porter.
	190	M. 24	Aortic arch	Nailer. Intemperate.	Pressure on the trachea . .	Mr. Porter.
	191	F. 34	Aortic arch	.....	Suffocation. The sac entire	Mr. Porter.
	192	M. 38	Both Popliteal	Infantry soldier. Violent and irregular exercise	Both femoral arteries tied s. .	Mr. Collis.
	193	M. 30	Lt. Popliteal	Labourer . . .	Femoral tied—hemorrhage on the 8th and 13th days—pressure—recovery	Mr. Collis.
Vol. v.	194	M. 29	Lt. Popliteal	Supposed to have been caused by sequestrum of bone	Death from mortification and hemorrhage. No operation	Mr. Porter.
	195	M. 38	Hepatic	Habits regular. Aneurism not suspected	Burst into the peritoneum	Dr. Stokes.
	196	M.	Innominata	Shoemaker. Double pulsation, diminishing towards the heart	Pressure on the trachea . .	Dr. Stokes.
	197	M. 26	Thoracic Aorta	No bruit. Jugular veins distended. Neck swollen	Rupture into the pleura . . .	Dr. Stokes.
	198	M. 50	Ascending Aorta	Fall on the side 4 months before. No abnormal sound	Rupture into the pericardium .	Dr. Stokes.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Dublin Journal. Vol. v.	199	M.	Abdominal Aorta	Infantry soldier	Rupture into the peritoneum	Dr. Stokes.
	200	M.	Abdominal Aorta large	Soldier. The man supposed to have been an impostor	Sac ruptured	Dr. Stokes.
	201	M. 30	Abdominal Aorta	Gentleman. First supposed to have been psoas abscess	Rupture into the left pleura	Dr. Stokes.
Vol. vii.	202	M.	Descending Thoracic	Sawyer. No distinct bruit anteriorly, but it can be heard slightly in the back	Rupture into the left bronchus. Two aneurisms	Dr. Greene.
	203	F. 27	Aortic arch	Two months before fell down a flight of steps on her back. Double impulse. No bruit.	Sudden death. Sac entire . .	Dr. Greene.
	204	M. 38	Aortic arch	Butler. Double impulse. Bruit de scie	Rupture into the left bronchus	Dr. Greene.
Vol. x.	205	M. 43	Descending Thoracic	Dysphagia . .	Burst into right pleura . . .	Dr. Greene.
	206	M. 27	Rt. Posterior Tibial		Femoral tied. Death on the 41st day from suppuration along the course of the artery. Two ligatures used	Dr. Brown.
	207	M. 30	Descending Thoracic	Horse-soldier. Kick on the chest from a horse. No bruit. Tumour appeared in the back	Burst into left pleura . .	Dr. Green.
Vol. xii.	208	M. 38	Abdominal Aorta	Travelling clerk. Supposed to have been disease of kidney	Burst behind the peritoneum	Dr. Morrison.
Vol. xv.	209	M. 53	Ascending Thoracic	Double bellows-sound	Empyema and tubercle . .	Mr. Ferrall, P. S.
Vol. xvi.	210	M.	Subclavian	Diffused Aneurism	The sac penetrated by the needle. Sponge introduced. Death from hemorrhage on the 10th day	Mr. Cusac.
	211	M.	Abdominal Aorta	Near the celiac axis. Violent pain	Cellular membrane around the kidney infiltrated with blood	Dr. Green, P.S.
Vol. ix.	212	F. 35	Ascending Aorta, posterior part	Diseased Aortic valves. Musical bellows-sound	Death from exhaustion . .	Dr. Mc Adam.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Dublin Journal. Vol. ix.	213	M.	30	Ascending Aorta	Sac projected into to the ventricles	Mr. Smith, P. S.
	214	M.	24	Ascending Aorta Blacksmith .	Burst into the pericardium. The coats separated to a small extent. Dissecting	Mr. Smith, P. S.
	215	F.	70	Ascending Aorta	Burst into the pericardium. Dissecting	Mr. Smith, P. S.
Vol. xv.	216	M.	31	Ascending Aorta Loud bruit .	From the sinus of one of the valves passed into the wall of the left ventricle	Dr. Hanna.
Vol. xvii.	217	M.	38	Ascending Aorta Soldier. A tree fell on his back	Tubercles in the lungs . . .	Dr. Stokes, P. S.
	218	M.	38	Lt. Internal carotid	Common carotid tied. Suppuration of the sac. The sac opened. Death from hemorrhage 20 days after the operation	Mr. Porter.
	219	M.		Ascending Aorta and Arch Tumour above the clavicle	Sac burst externally, very large. No coagulum	Mr. Porter.
	220	M.	41	Innominate Fall when hunting.	Sudden death. Sac not burst. Two fusiform aneurisms	Sir P. Cramp-ton, P. S.
Vol. xviii.	221	M.	22	Ascending Aorta Orthopnoea, anasarca, fremitus, and loud bellows-sound	Communication with pulmonary artery	Mr. Smith, P. S.
	222	M.		Rt. Common Iliac	True fusiform aneurism communicating with the vein	Mr. Adams, P. S.
Vol. xix.	223	M.	32	Ascending Aorta Bellows-sound	Sinus of Valsalva. Hydropericardium	Mr. Carmichael.
	224	M.	30	Ascending Aorta, origin of Orthopnoea. Loud bellows-sound	Sac the size of a walnut, situated in left ventricle. Regurgitation into the ventricle the cause of death	Sir H. Marsh, P. S.
	225	M.	28	Popliteal	Femoral tied. Death from gangrene	Mr. Adams, P. S.
Vol. xxi.	226	M.	30	Ascending Aorta Labourer. Used to lift large masses of stone, making the breast-bone a fulcrum	Enormous tumour. Serous effusion into the pleuræ	Dr. Duncan.
	227	F.		Ascending Aorta Tumour in the back	Burst into the pericardium .	Dr. Corrigan, P. S.
	228	M.	30	Ascending Aorta Coal-porter. Double pulsation. No bruit. Right pulse weaker than the left. Dyspnoea	Sac bilocular. Pressure on the trachea	Dr. Law.
	229	M.	40	Ascending Aorta and Arch Double pulsation	Burst into the pericardium .	Dr. Ferguson.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.	
Dublin Journal. Vol. xxi.	230	M.	42	Ascending Aorta	Livid countenance, great distress and anxiety. Coachman.	Communication with vena cava	Dr. Law.
	231	M.	38	Abdominal Aorta near celiac axis	Bellows-sound louder in the back	Burst behind the peritoneum	Dr. Law.
	232	M.	35	Abdominal Aorta near celiac axis	Ploughman	Burst behind the peritoneum	Dr. Law.
	233	M.	26	Femoral at the groin	Car-driver. Intemperate. Bruise 2 years before from the step of a car	External iliac tied s. The circumflex vein over the artery	Mr. Houston.
	234	M.	43	Descending Thoracic. Four Aneurisms	Shoemaker. Fall on the left side. No bellows-sound. Pulsation in the back. Could swallow best on his hands and knees.	Enormous cavity. Sac formed by the pleura and cellular membrane. Pressure on the trachea	Dr. Law.
Vol. xxii.	235	M.	30	Ascending Aorta	Quarryman. Intemperate. Double bellows-sound	Aneurism large. Sac entire. Suffocation	Dr. J. Duncan, P. S.
	236	M.	32	Rt. External iliac	Brushmaker. Constantly turning a lathe with the right foot.	Ligature of the external iliac close to the bifurcation s. First case of ligature of this vessel for aneurism of the external iliac	Dr. Bellingham.
Vol. xxiii.	237	M.		Abdominal Aorta	Strong pulsation and bellows-sound in the epigastrium	Sac opened into the lung .	Dr. Stokes, P. S.
	238	M.	47	Aortic arch	Luxation of the humerus. No pulsation at the right wrist	Paralysis. Pressure on the trachea. Sac entire	Mr. Smith, P. S.
	239	M.	30	Rt. Popliteal	Labourer. Subject to violent cramps in the right leg	Pressure by means of a screw and pad on the femoral artery at the groin at intervals. Cured in six weeks	Dr. E. Hutton, Oct. 3, 1842.
	240	M.	55	Lt. Popliteal	Labourer. Used to carry heavy burthens up a ladder	Pressure as above for 7 weeks. Cure	Mr. Cusac.
	241	M.	32	Rt. Popliteal	Indoor servant. Temperate	Pressure on the pubis. Pulsation in the tumour stopped after eight hours. Cure	Mr. Bellingham.

Authorities.		Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Dublin Journal. Vol. xxiv.	242	M.	60	Ascending Aorta	.....	Rupture into pericardium. Dissecting aneurism	Dr. Kirkpatrick, P. S.
	243	M.	40	Ascending Aorta	Double soufflet behind the sternum	Cerebral congestion	Dr. O'Farrell, P. S.
	244	M.	35	Arch and Descending Aorta	Clerk. No abnormal sound. Pulse absent at the left wrist. Fell from the top of a coach	Two aneurisms—spontaneous cure of the smaller. Sac entire. Suffocation	Dr. O'Bryen, P. S.
	245	F.		Abdominal Aorta	Severe injury eleven years before.	Effusion of blood behind the peritoneum and pleura	Dr. Green, P. S.
	246	M.	42	Ascending Aorta	.....	Compression of the cava. Venous congestion of the upper part of the body	Dr. Law, P. S.
Vol. xxv.	247	F.	60	Ascending Aorta	.....	Burst into pericardium. Dissecting aneurism	Dr. Lees, P. S.
	248	M.	45	Aortic arch	No murmur or bruit	Pressure on the trachea	Mr. O'Farrell.
	249	M.		Ascending Aorta	.....	Burst into pericardium	Dr. Ferguson.
	250	M.	62	Arch and Descending Thoracic	Slater. Fell from a height a year since and struck his breast against a ladder. Double sound.	Rupture into the left pleura. True aneurism of the arch, and false of the descending aorta	Dr. Law.
	251	M.	35	Abdominal Aorta near cæliac axis	Labourer. Musical soufflet and bellows-sound	Opened into left pleura	Dr. Law.
Vol. xxv.	252	M.	50	Abdominal Aorta	Asinglesoufflet in the back. Large tumour in the loins	Jaundice and diarrhœa	Dr. Hutton, P. S.
	253	M.	47	Innominate	.....	Right carotid tied. Death on the 76th day—tumour enlarged before death	Dr. Hutton, P. S.
	254	M.		Ascending Aorta	Soldier. Intense dyspnoea	Apoplexy of the left lung	Dr. Bigger, P. S.
	255	M.	54	Basilar	Insane for 3 years, deafness	The tumour the size of a small apple—sac entire	Mr. Smith, P. S.
Vol. xxvi.	256	M.	33	External Iliac	Secondary—tumour as large as before	Pressure first tried on the distal side, then on the tumour—cure	Dr. Bellingham.
	257	M.	33	Both Popliteal	Aneurism of the right popliteal cured by pressure 15 months before	Femoral compressed at the groin, also lower down—cure	Dr. Bellingham.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Dublin Journal. Vol. xxvi.	258	M.	Splenic	.....	Burst into the colon . .	Mr Parker.
	259	M. 32	Abdominal Aorta (2 aneurisms—1 cæliacaxis)	Porter. Bellows sound in the epigastric region and back—violent pain	Two aneurisms larger — burst behind the peritoneum	Dr. Vose, Liverpool Infirmary.
	260	M. 42	Abdominal Aorta	Cab-driver. No signs of aneurism	Sac large, forming two divisions —burst into peritoneum	Dr. Vose.
	261	F. 50	Ascending Aorta	.....	Burst into the pericardium—dissecting aneurism	Dr. Mac Donnell.
Vol. xxvii.	262	M. 26	Lt. Popliteal	Thrown from his horse while hunting, tumour large	Cured by pressure—two instruments used	Mr. Cusac.
Northern Jour. of Med. Vol. ii.	263	M. 30	Rt. Femoral	Sailor. Sudden pain in the right groin when reefing a sail	External iliac tied s. . .	Dr. Duncan.
Dublin Hospital Reports. Vol. ii.	264	F. 32	Femoral (at the groin)	Coachmaker	External iliac tied s. . .	Mr. Wilmot.
	265	M. 22	Femoral (at the groin)	Robust health, accustomed to active exercise	External iliac tied. Death on the 14th day, apparently from exhaustion—sloughing of the sac.	Mr. Todd.
Vol. iii.	266	M. 28	Lt. Femoral (at the groin)	Printer. Struck the groin with the handle of a printing-press seven months before —small pulsating tumour appeared 14 days after	External iliac tied. Hemorrhage —artery tied again — death six days after.	Mr. Todd.
	267	M. 30	Rt. Popliteal	Farmer. Tumour appeared five weeks before, after a hard day's ploughing	Femoral tied s. . . .	Mr. Todd.
	268	M. 27	Lt. Popliteal	Labourer. Strong and healthy, foot slipped when climbing a wall, swelling 7 days after	Femoral tied s. . . .	Mr. Todd.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.	
Dublin Hospital Reports, Vol. iii.	269	F.	28	Posterior part of the right forearm	Hat-binder. No injury.	Brachial tied. Pulsation ceased—the tumour remained	Mr. Todd.
	270	F.	middle aged	Abdominal Aorta and Iliac	.....	Dissecting aneurism	Mr. Shekelton.
	271	F.	middle aged	Abdominal Aorta	.....	Tuberculated lungs—dissecting aneurism	Mr. Shekelton.
	272	M.	35	Rt. Axillary	Labourer. Robust.	Subclavian tied s. . . .	Mr. Todd.
Vol. v.	273	M.	29	Abdominal Aorta	Locksmith. Double pulsation	Sudden death. No examination	Dr. Stokes.
	274	M.	33	Abdominal Aorta near the celiac	Gentleman . .	Burst into the left pleura .	Dr. Beatty.
	275	M.	40	Lt. Subclavian	Ostler	Subclavian tied s. . . .	Mr. Porter.
	276	F.	40	Rt. Carotid	Servant. Observed fifteen years before, but it increased after striking the neck against a bed-post	Common carotid tied. Suppuration of the sac—cure in seven months	Mr. Porter.
Transact. of the King's and Queen's College of Physicians, Ireland, Vol. i.	277	M.	34	Gluteal	Merchant	Cured by pressure on the tumour	Mr. Crampton.
	278	M.	40	Rt. Popliteal	.....	Femoral tied. Death on the 18th day from phlebitis	Mr. Carmichael.
Vol. ii.	279	M.		Popliteal	.....	Femoral tied. Needle passed through the vein—varicose aneurism—death from hemorrhage	Meath Hospital
Lancet, 1824.	280	M.	43	Lt. Femoro-Popliteal	Labourer. Used to turn a heavy wheel	Femoral tied s. . . .	Mr. Key, Guy's.
	281	M.	45	Rt. Femoral	.....	Femoral tied s. . . .	Mr. Key, Guy's.
1825.	282	M.	33	Rt. Axillary	.....	Subclavian tied s. . . .	Mr. Green, St. Thomas's.
	283	M.	49	Thoracic Aorta	.....	Hæmoptysis	Mr. Joberns, Middlesex Hospital.
	284	M.	37	Rt. Axillary	Soldier. Organic disease of the heart	Not known	Sir E. Home.
	285	M.	31	Lt. Femoral (upper 3d) another in the right—diffused	.....	External iliac tied. Death on the 8th day from exhaustion	Mr. Lawrence, St. Bartholomew's.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Lancet, 1825.	286 M.	33	Popliteal	Shoemaker	Femoral tied s.	Mr. Key, Guy's.
	287 M.	45	Rt. Popliteal (dif-fused)	.....	Amputation of the thigh. Cure	Mr. Travers, St. Thomas's.
	288 F.	52	Lt. Popliteal	Market-gardener. Carried heavy weights and accustomed to walk long distances	Femoral tied. Death from diseased lungs	Mr. Key, Guy's.
	289 M.	40	Ascending Aorta	.....	Sudden death, but the sac did not burst	Mr. Stanley.
1826.	290 F.	29	Femoral	.....	Femoral tied on the distal side. Death	Mr. White, Westminster.
	291 F.	57	Common Carotid	.....	Artery tied on the distal side. Operation reported successful	Mr. Wardrop.
	292 F.	49	Rt. Common Carotid	.....	Artery tied on the distal side. Death from hemorrhage two months after	Mr. Lambert.
	293 M.	30	Ascending Aorta	Butcher	Burst into pericardium	St. Bartholomew's.
	294 M.	38	Innominate	Blacksmith	Spontaneous obliteration of the right carotid	Middlesex Hospital.
	295 M.	33	Abdominal Aorta	Very large. No bellows-sound	Sac perfect. Cause of death uncertain	Dr. Elliotson, St. Thomas's.
1827.	296 M.	38	Popliteal	Stonemason. Large aneurism	Femoral tied: the thigh afterwards amputated s.	Sir A. Carlisle, Westminster Hospital
	297 M.	32	Lt. Popliteal	Blacksmith	Femoral tied s.	Mr. Tyrrel, St. Thomas's.
	298 M.	30	Popliteal	.....	Femoral tied s.	Sir A. Carlisle, Westminster.
1828.	299 M.	50	Popliteal	Carrier. Large aneurism	Femoral tied: bleeding externally. Iliac tied—frequent hemorrhage—death	Sir B. Brodie, St. George's.
	300 M.	42	Popliteal	.....	.....	Mr. Lawrence, St. Bartholomew's.
	301 M.	72	Femoral (upper 3d)	Labourer. Blow on the thigh eight months before	Spontaneous cure: wound healed on the 50th day: died afterwards of dry gangrene of both feet	Mr. Lyford, Westminster Hospital.
	302 M.	40	Axillary	.....	Subclavian tied. Death two months afterwards from hemorrhage	Mr. B. Cooper, Guy's.
	303 M.	37	Rt. Axillary	Sailor	The aneurism too large for an operation. The man gradually sunk	Mr. Lawrence, St. Bartholomew's.
	304 M.	50	Femoral, at the groin	.....	External iliac tied s. Pulsation in the sac, but it subsided on the 6th day	Mr. Morgan, Guy's.
	305 M.	31	Rt. Popliteal	Baker	Femoral tied s.	Mr. Key, Guy's.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Lancet, 1828.	306	F. 53	Ascending Aorta and Arch	Appeared first on the upper part of the sternum—disappeared and reappeared	Burst externally . . .	Mr. Lawrence, St. Bartholomew's.
	307	F. 90	Lt. Popliteal	.....	Femoral tied s. Could walk half a mile seven months after the operation	Mr. Stevenson, Worcester.
	308	M. 37	Lt. Femoro-Popliteal	Labourer. A cart-load of lime fell on the leg two years before	Femoral tied s. . . .	Mr. Tyrrel, St. Thomas's.
	309	M. 40	Ascending Aorta	Injury on the chest	Burst into the left pleura	St. Bartholomew's.
	310	F. 36	Rt. Carotid	.....	Carotid tied s. on the distal side	Dr. Bush.
	311	M. 34	Ascending Aorta	Glass-cutter	Burst into the right lung	Dr. Bright, Guy's.
	312	F. —	Femoro-Popliteal	.....	Femoral tied s. . . .	Mr. Tyrrel, St Thomas's.
	313	M. 46	Rt. Popliteal	Soldier. Great drunkard	Femoral tied. Death on the 12th day from mortification of the leg	Sir A. Carlisle, Westminster Hospital.
	314	M. 38	Innominate	Butcher . . .	Carotid tied on the distal side. Able to resume his occupation in thirteen weeks—well nine years after the operation	Mr. Evans, Belpar.
	315	M. 42	Aortic arch	Baker. Dyspnoea. Aneurism not suspected	Died from a fall . . .	Dr. Gregory, W. M. S.
1829.	316	M.	Ascending Aorta and Arch	Builder. Piece of timber fell on his chest 6 months before. Intense bellows-sound	Pressure on the pulmonary artery	Dr. Corrigan.
	317	M. 30	Descending Aorta	Shoemaker. Bellows-sound	Burst into the right pleura	Sir G. Tuthill, West. Hos.
	318	M. 35	Basilar	Soldier. General paralysis. The aneurism the size of a chestnut	Cerebral congestion .	Dr. Bright, Westminster Hospital.
	319	M. 44	Thoracic (Descending)	Tumour disappeared before death	Rupture into the left lung	Mr. Lawrence, St. Bartholomew's.
	320	F. 43	Renal	Lady. Profuse discharge of blood from the bladder for 9 days	Burst into the pelvis of the kidneys	Mr. Gosset, L. M. S.
	321	M. 57	Ascending Aorta and Arch	Tumour large. No bellows-sound	Sudden death; but the sac did not burst	Mr. Green, St. Thomas's.
1830.						

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Lancet. 1830.	322 M.	63	Ascending Aorta	Tumour at the lower and right side of the sternum. No bruit	Sudden death; but the sac did not burst	Dr. Elliotson, St. Thomas's.
	323 M.	51	Aortic arch	Sailor. Loud bellows-sound. Dyspnœa	Innominate dilated at its origin	Dr. Elliotson, St. Thomas's.
	324 M.	31	Rt. Femoro Popliteal	Sailor	Leg amputated. Death about 30 hours after the operation from exhaustion	Mr. Bennet.
	325 M.	42	Ascending Aorta and Arch	Tumour under right clavicle. Fell from a coach.	Burst into right lung	Dr. Melliush.
	326 F.	31	Thoracic Aorta	Hæmoptysis	Death. No report of inspection	Dr. Elliotson.
1831.	327 M.	28	Lt. Ilio-Femoral	Labourer. Hard porter-drinker	External iliac tied s.	Mr. Guthrie, Westminster Hospital.
1832.	328 F.	46	Aortic arch		Death probably from suffocation Sac not ruptured	Westminster Hospital.
	329 M.	35	Abdominal Aorta near celiac axis	Sailor. Intemperate. No abnormal sound	Burst into left pleura	Dr. Bright, Westminster Hospital.
	330 M.	35	Lt. Popliteal	Gardener . .	Cure by pressure . . .	Mr. Lynn, Westminster Hospital
	331 M.	27	Abdominal Aorta	One cwt. of fish fell on his loins 2 years before	Two aneurisms the larger burst	Dr. Elliotson, U. C. H.
	332 M.	31	Rt. Subclavian		Innominate tied. Death on the 18th day from hemorrhage	Mr. Bland, Sydney.
	333 F.	21	Lt. Subclavian	Lady. Came on after attempting to save herself from a fall with the left arm	Subclavian tied s.	Mr. Nichols. <i>Now with</i>
	334 M.	41	Aortic arch	Coachman. Dyspnœa and Œdema	Communication with the superior cava	St. Bartholomew's
1833.	335 M.		Lt. Carotid	Labourer . .	Carotid tied on distal side. Death on the 125th day after the operation. Purulent discharge from the mouth. Hæmoptysis. Artery, sac, and vein obliterated	Mr. Montgomery, Port Louis.
	336 M.	40	Femoral at the groin		External iliac tied s.	Mr. Smith, Bristol.
	337 M.	28	Rt. Femoral, upper third	Used to carry heavy bales upstairs	External iliac tied s.	Dr. Sinclair.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Lancet. 1833.	338 M.		Ascending Aorta	Edema	Communicated with superior cava. This vein obliterated near its termination	Dr. Wilson, Middlesex H.
	339 M.	54	Basilar	Soldier. Blow on the head some time before	Pressure on the medulla oblongata	Mr. Jennings.
1834.	340 M.	40	Popliteal		Femoral tied. . . .	Mr. Morgan, Guy's.
	341 M.	16	Ascending Aorta	Practised tumbling and other feats of activity	Burst into pericardium. Lived 52 hours	Mr. Jones.
1835.	342 M.	44	Popliteal	Shoemaker .	Femoral tied s. . . .	Mr. Barry.
	343 M.		Abdominal Aorta, near the celiac axis	Gentleman . Mistaken for abscess, and lancet introduced by another surgeon. Bel-lows-sound	Rupture into the peritoneal sac	Mr. Fearn.
1835.	344 F.		Lt. Axillary		Subclavian tied s. . . .	Mr. Lizars.
	345 M.		Aortic arch	Soldier. When fighting six months before felt something give way in the chest. Wheezing. No bruit.	Pressure on the trachea .	Mr. Fearn.
	346 M.	44	Superior Mesenteric	Fell some months before when carrying a hamper of wine	Scarlatina	Dr. Elliotson, U. C. H.
	347 M.	69	Lt. Popliteal	Standing position nearly all the day	Femoral tied s. . . .	Mr. Lawrence, St. Bartholomew's
1836.	348 M.	52	Arch. Innominata and Descending Aorta	Sawyer. Intemperate. Struck on the chest with a heavy piece of timber	Rupture into the left pleura	Mr. Ray.
1837.	349 F.	28	Innominata	After violent fit of coughing	C. carotid tied. The subclavian 2 years afterwards. Died 4 months after the last operation	Mr. Fearn.
	350 M.	30	Rt. Subclavian	Carter	Innominata tied. Death 21 days after from hemorrhage	Mr. Lizars.
	351 M.	45	Aortic arch		Burst into pericardium .	Mr. Hooper.
1838.	352 M.	31	Rt. Subclavian	Tailor	Rt. carotid and subclavian tied. Death from hemorrhage on the 13th day	Mr. Liston.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Lancet. 1839.	353	M. 46	Femoral, (upper 3d)	Sailor. Fall from the mast of a ship Habits intemperate	External iliac tied s.	Mr. Walker, St. George's.
	354	M. 52	Common Carotid	Major in the army. Fall from a horse	Lost 100 ozs. of blood from the mouth. Carotid tied at its origin s.	Dr. Robertson.
	355	M. 38	Both Popliteal	Had carried 5 cwts. for wagers	Both femorals tied; an interval of 3 months between the operations. The man 12 months after could carry a sack of flour. Pulsation in the sac, which afterwards disappeared	Mr. Bird.
	356	M. 75	Aortic arch	Aneurism not suspected	Left carotid obliterated by the pressure of the tumour	Mr. Pilcher, L. M. S.
	357	M. 54	Abdominal Aorta	Porter. Violent fall on the curb-stone. Not suspected	Tumour large and double.	Mr. Walker.
	358	M. 32	Rt. Subclavian	Clerk. Was salivated 6 years before	Subclavian tied anterior to the scalenus. Death from hemorrhage on the 36th day	Mr. Liston.
1841.	359	M. 41	Branch of Pulmonary		Hæmoptysis	Mr. Fearn.
	360	F. 51	Aortic arch		Serous effusion into the pleuræ. Sac entire	Dr. Boyd. +
	361	F. 70	Ascending and Arch	These were all in the St. Marylebone Infirmary, & but little was known of their previous history	Dissecting aneurism	Dr. Boyd. +
	362	M. 68	Thoracic Aorta		Dissecting. Rupture into the pericardium	Dr. Boyd. +
	363	M. 50	Aortic arch		Sac not ruptured	Dr. Boyd.
	364	F. 55	Aortic arch		Not stated	Dr. Boyd.
	365	F. 46	Aortic arch		Pressure on recurrent laryngeal nerve	Dr. Todd, King's College.
	366	M. 41	Innominate	Compositor. Accustomed to lift heavy weights	Death from exhaustion	Mr. Maxwell.
	367	M. 39	Innominate and Ascending Aorta	Soldier. Felt something snap when suddenly extending the arm	Tumour burst externally	Westminster Hospital.
	368	M. 35	Rt. Subclavian	Fall from a pile of cotton	Subclavian tied s.	Mr. Halton.
1843.	369	M. 30	Lt. Femoral (lower part)	Tinplate-worker	Cured by pressure (presse artère) over the lower part of the upper third of the femoral—10 weeks	Mr. Liston.
1844.	370	M. 31	Ascending Aorta and Arch	Pressure on the trachea. Tracheotomy	Rupture into the trachea	Mr. Judd. X

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Lancet. 1844.	371	M. 35	Ascending Aorta		Burst into pericardium . .	Mr. Snow.
	372	M. 28	Aortic arch	Gardener. Variation of the pulse at the wrists	Left subclavian obstructed—Innominate partially so	Mr. Tripe, London Hospital.
	373	M. 36	Ascending Aorta	Sailor . . .	Opened into right auricle .	Mr. Tripe, London Hospital.
	374	F. 47	Innominate	Absence of pulse in the right radial. Pulsation at the sternal end of the clavicle diminishing near the heart	Right carotid nearly obliterated—pressure on the right bronchus	Mr. Barrow.
1845.	375	M. 32	Rt. Popliteal	Sailor . . .	Cured by pressure in 2 months. Liston's tourniquet used above—Dr. Allen's on the ham	Dr. Allen.
	376	M.	Rt. Popliteal, small aneurism also in the left	Orange-porter	Right femoral tied s. Pressure with compress and bandage on the left—supposed cure—return of pulsation—the artery tied successfully	Mr. B. Cooper, M. C. S.
	377	M.	Both Popliteal		One femoral tied s.—pressure tried on the other for six months—supposed cure—return of pulsation—artery tied s.	Mr. B. Cooper, M. C. S.
	378	M. 41	Ascending Aorta	Sailor . . .	Opened into right ventricle and pulmonary artery	Dr. Turnbull.
	379	M. 35	Ascending Aorta	Porter . . .	True aneurism—sac entire—distended stomach	Dr. Turnbull.
	380	M. 30	Lt. Popliteal	Horse-keeper	Femoral tied s.	Mr. Hancock, Charing Cross Hospital.
1846.	381	M. 42	Ascending Aorta	Bricklayer. No bruit	Died in a state of coma .	Mr. Fenwick.
	382	M. 32	Abdominal Aorta	Pain during and after micturition	Burst into the peritoneum .	Mr. Greenhow.
	383	M. 42	Abdominal Aorta	Keelman . .	Burst behind the peritoneum .	Dr. Bates.
Ryan's Journal. Vol. iii.	384	M. 33	Descending Thoracic and Double Abdominal	Groom . .	Rupture into the peritoneal sac	Dr. Roots, St. Thomas's.
Vol. v.	385	M. 43	Descending Thoracic and Abdominal	Porter . . .	Sanguineous apoplexy—sacs entire	Mr. Douglas.
	386	M. 54	Aortic arch	Dyspnœa . .	Pressure on the trachea—sac entire	Mr. Douglas.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.	
Medical Gazette. Vol. i.	387	M.	38	Rt. Subclavian	Wood-hawker. Intemperate	Subclavian tied. Death 6 weeks after from suppuration of the sac	Mr. Cooper, Guy's.
	388	M.	38	Lt. Femoral (upper 3d)	After making exertion felt something give way in the groin	External iliac tied s. . . .	Sir B. Brodie, St. George's.
	389	F.	42	Aortic arch	Not suspected	Pressure on the trachea . . .	Dr. Cholmeley, Guy's.
Vol. ii.	390	M.	43	Descending Thoracic	Slater. Run over by a cart 4 years before. Inordinate pulsation, and saw-sound in all the branches from the arch	Exhaustion and suffocation . . .	Dr. Elliotson, St. Thomas's.
	391	F.	32	Abdominal Aorta	Near the cæliac axis; artery otherwise sound	Exhaustion—sac not ruptured	Dr. Hue, St. Bartholomew's.
	392	M.	30	Ascending Aorta	Two years since fell, and struck his chest against a hard substance. Not discovered	Sac not ruptured	Dr. Bright, Guy's.
Vol. iii.	393	M.	28	Lt. Popliteal	Six weeks before, slipped when running	Femoral tied s.	Mr. Key, Guy's.
	394	M.	24	Abdominal Aorta near cæliac axis		Sac supposed to have been ruptured by vomiting	Dr. Mayo.
Vol. iv.	395	M.	38	Abdominal Aorta near cæliac axis	Not discovered	Burst into the peritoneal sac .	Mr. Harland.
	396	M.	48	Lt. External Iliac		Femoral first tied on the distal side, then the abdominal aorta—death a few hours after the operation	Mr. James, Exeter.
	397	M.	39	Rt. Subclavian	Ostler	Subclavian tied s. Abscess of the sac	Mr. Porter.
Vol. v.	398	M.	48	Lt. Femoral		Femoral tied s.	Mr. Key, Guy's.
	399	M.	30	Femoro-Popliteal	Labourer. Accustomed to lift heavy weights. Lancet introduced for supposed abscess by another surgeon	Femoral tied—amputation—the man did well	Mr. Pierpoint.

Authorities.		Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Medical Gazette. Vol. vi.	400	M.	30	Rt. Ilio-Femoral	Porter . . .	Spontaneous cure—report 12 months after	Mr. Lawrence, St. Bartholomew's.
	401	M.	42	Rt. Popliteal	Carpenter. Eight days before had spasmodic flexion of the leg, which he immediately thrust into the straight position	Femoral tied s. . . .	Mr. Key, Guy's.
	402	F.	61	Innominate	Laborious employment	Right carotid tied. Death an hour and a half after the operation—opening of left carotid very small	Mr. Key, Guy's.
Vol. vii.	403	M.	53	Both Popliteal	Shoemaker .	Both femoral arteries tied. Mortification of the leg—hemorrhage—external iliac tied s.	Mr. Braithwaite.
	404	M.	26	Lt. Popliteal	Carter. Rode 17 miles on horseback the day before it appeared	Femoral tied s. . . .	Mr. Guthrie, Westminster Hospital.
	405	M.	33	Lt. Popliteal	Gardener. The leg crushed between his companion's saddle and his own	Femoral tied s. . . .	Mr. Guthrie, Westminster Hospital.
	406	M.	41	Aortic arch	Sailor. Fell and injured the side 8 months before	Burst into right lung . .	London Hospital.
	407	M.	40	Rt. Popliteal	Insane. No pulsation nor bruit	Nature of the tumour doubtful—amputation—death a month after	Mr. Luke, London Hospital.
	408	M.	50	Ascending Aorta and Arch	Sailor . . .	Burst into the pericardium. .	Mr. West.
	409	F.	31	Ascending Aorta	Wife of a pedlar. Accustomed to walk 20 miles a-day in a hilly country	Sudden death—sac not ruptured	Dr. Elliotson, St. Thomas's.
Vol. viii.	410	M.	34	Abdominal Aorta (in the celiac axis)	Butcher. When attempting to lift a heavy weight, felt a violent pain in the pit of the stomach. Bellows-sound	Ruptured behind the peritoneum	Mr. Hamilton.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Medical Gazette. Vol. viii.	411	M.	45	Abdominal Aorta	Labourer. When lifting corn 2 years before, felt something snap in the back	Exhaustion from diarrhoea . London Hos- pital.
Vol. ix.	412	M.	27	Lt.Femoral (upper 3d)	Bookbinder. Mistaken for abscess—opened by a surgeon—four pints of blood lost	External iliac tied. Death from mortification of the leg on the 3d day Mr. Guthrie, Westminster Hospital.
	413	M.	50	Rt. Subclavian	Stableman . Died on the 6th day after tying of the subclavian—apparently from exhaustion	Sir B. Brodie, St. George's.
	414	M.		Abdominal Aorta near the diaphragm	Violent fall 6 weeks before	Burst into the posterior medias- tinum. Inner membrane of the aorta of a bright scarlet London Hospital.
Vol. x.	415	M.	47	Abdominal and Tho- racicAorta	Lath-render. Not suspected	Burst into the thorax . . Mr. Bullen.
	416	M.	28	Abdominal Aorta	Policeman . Two aneurisms near the cæliac axis	Dr. Watson, Middlesex Hospital.
Vol. xiii.	417	M.	30	Lt.Femoral (upper 3d)	Striker in an iron-foundry. Blow with a hammer	External iliac tied s. . . Mr. Banner.
	418	M.	9	Lt.Femoral (upper 3d)	Kicked by one of his com- panions on the thigh 18 months before The tumour disappeared & reappeared	External iliac tied s. . . Mr. Grundy.
	419	M.	mid. aged	Descend- ing Tho- racic	Working- silversmith	Pressure on bronchus . . Mr. Crookes.
Vol. xiv.	420	M.	36	Lt. Popli- teal (dif- fused)	Carman . .	External iliac tied s. . . Mr. Scott.
	421	M.	80	Lt.Femoral (upper 3d)	Knocked down 11 weeks be- fore	Died without operation . . Mr. Robinson.
	422	M.	42	Abdominal Aorta	General dropsy —hæmaturia	Two distinct communications with the inferior cava Dr. Frampton.
Vol. xv.	423	M.	33	Rt. Com- mon Iliac	Sailor.Exposed to hard labour in whale-fish- ing	Aorta tied. Death 23 hours after the operation. Dr. Murray, Cape of Good Hope.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.	
Medical Gazette. Vol. xv.	424	M.	39	Femoral .	Blow from the end of a fowling-piece	The femoral tied at the groin. Hemorrhage — the external iliac tied—great loss of blood —recovery	Dr. Murray, Cape of Good Hope.
Vol. xvi.	425	F.	38	Ascending Aorta	Washerwoman	Burst into the pericardium — dissecting aneurism	Mr. Statham.
Vol. xvii.	426	M.	24	Rt. Femoral (upper 3d)	Footman. Seven months before his foot slipped whilst carrying a heavy weight	External iliac tied s. . . .	Mr. Turner.
Vol. xviii.	427	M.	30	Ascending Aorta		True aneurism of the ascending aorta, and false of the arch	Mr. Hunter.
Vol. xix.	428	M.	37	Lt. Popliteal		Femoral tied s.	Mr. Busk.
Vol. xx.	429	M.	40	Abdominal Aorta	Gardener. Bellows-sound not heard in the erect position	True aneurism just below the celiac axis, size of hen's egg —burst behind peritoneum	Dr. Graves.
	430	M.	39	Abdominal Aorta	Waterman. Pain when using great exertion in drawing a truck some months before —no bellows-sound	Serous effusion in the pleuræ .	Mr. Mitchell.
Vol. xxiii.	431	M.	40	Innominate and Arch (3 aneurisms)	Tumour disappeared	Origins of left carotid and subclavian closed	Dr. Hughes.
	432	M.	50	Ascending Thoracic	Tumour suddenly became smaller. No bellows-sound	Bronchitis	Dr. Hughes.
	433	M.	44	Ascending Thoracic		Burst into the pericardium .	Mr. Watson.
	434	M.	46	Lt. Popliteal	Twenty days before fell from stepping on orange-peel —confirmed drunkard	Femoral tied s.	Mr. B. Phillips.
	435	F.	75	Ascending Thoracic		Blood effused between the laminae of the middle coat—dissecting.	Dr. Pennock.
	436	F.		Ascending Thoracic		Burst into the pericardium — dissecting aneurism	Dr. Goddard.
Vol. xxvi.	437	M.	41	Popliteal .	Policeman .	Femoral tied s.	Mr. Bullock.
	438	M.		Ascending Aorta	Blacksmith .	Supposed to have opened into the pericardium sometime before death	Dr. T. Thompson.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.	
Medical Gazette. Vol. xxvi.	439	M.	50	Innominate; small aneurism at the arch	Sailor. Pulse absent in the right arm—violent pain in the arm—veins of the neck turgid	Right subclavian obliterated .	Dr. Budd.
	440	M.	33	Innominate	Pulse at the rt. wrist small—veins of the neck turgid	Acute pericarditis . . .	Dr. Watson.
	441	M.	44	Innominate	Superior extremities œdematous—veins of the neck turgid	Sac entire	Dr. Wilson.
Vol. xxvii.	442	M.	39	Aortic arch	Weaver . .	Burst into the œsophagus .	Dr. Davidson.
	443	M.	34	Popliteal (diffused)	Coalheaver. Intemperate	Femoral tied s. Ulceration of the integuments	Mr. Quain, U. C. H.
Vol. xxviii.	444	M.		Lt. Subclavian		Subclavian tied s.	Mr. Skey.
Vol. xxxi.	445	M.	53	Rt. Popliteal (diffused)	Intemperate .	Femoral tied. Two branches tied before the femoral was secured—death on the 43d day	Mr. B. Phillips St. Marylebone Infirmary.
	446	M.	29	Rt. Common Carotid	Fisherman. Pugilist	Carotid tied s.	Mr. Hunter.
1842.	447	M.	31	Rt. Popliteal	Soldier . .	Femoral tied s.	Dr. Laurie.
	448	M.	30	Ditto . .	Sailor . . .	Femoral tied s.	
	449	F.	23	Lt. Popliteal		Femoral tied s.	
	450	M.	22	Ditto . .	Porter . . .	Femoral tied s.	
	451	M.	31	Rt. Popliteal	Flesher. Acute pain in the ham after a fall	Femoral tied s.	
	452	M.		Lt. Popliteal	Sailor . . .	Femoral tied s.	Mr. B. Cooper, Guy's.
1845.	453	M.	51	Rt. Femoral (near the groin)	Carpenter. Stumbled over a stone when carrying a heavy weight	External iliac tied. Death on the 40th day. Hemorrhage, and Bright's disease of the kidneys.	
	454	M.	42	Rt. Popliteal	Muscular. Temperate	Pressure tried for 14 days with Wiess's presse artère. The femoral then tied s.		Mr. Harrison, Bristol Infirmary.
	455	M.	32	Rt. Femoral (near the groin)	Carter. Had bubo in the right groin 4 years before. Double beat above Poupart's ligament	External iliac tied. Death on the 7th day from tetanus.	Mr. Harrison, Bristol Infirmary.
	456	M.	31	Femoral (upper third)	Dock labourer	Adhesive plaster and spica bandage applied on the 3d of March. Pulsation in the tumour ceased on the 8th. Cure.	Mr. Luke, London Hospital.

M. C. S., Mr. Shaw.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Midland Surg. Reporter. Vol. i.	457 M.	24	Abdominal Aorta (near the cæliac axis)	Cattle dealer.	Rupture into the peritoneal sac	Dr. Malden.
	458 M.	35	Cæliac axis	Labourer. Intemperate	Burst behind the peritoneum	Mr. Baynham.
	459 M.	45	Aortic arch	Labourer.	Rupture into the trachea	Mr. Baynham.
Vose's Thesis on Aneurism of the Carotid.	460 F.	24	Carotid	Carried heavy weights on the head. Intemperate	Mistaken by another practitioner for sore throat. Death from pressure on the œsophagus	John Bell.
	461 M.	48	Lt. Common Carotid	Porter. Intemperate	Death from hemorrhage	John Bell.
Fergusson's Surg.	462 F.		Popliteal		Six months pregnant. Professor Hamilton objected to the operation before delivery. The sac ruptured during labour, and she died ten days afterwards	Mr. Watson.
Abernethy on Local Diseases.	463 M.	34	Lt. Femoral (at the groin and right Popliteal)		Rt. femoral tied s. The left tied above the profunda. Hemorrhage on the 15th day. External iliac tied. Death from bleeding on the 8th day. Double ligatures.	Sir C. Blicke. Mr. Abernethy.
	464 M.	40	Femoral (at the groin)	Sailor . . .	External iliac tied s. Two ligatures	Mr. Abernethy.
	465 M.	40	Femoral (at the groin)	Sugar-baker. Strain 3 weeks before	External iliac tied. Death the 23d day after the operation. Sloughing of the sac. Two ligatures	Mr. Abernethy.
Guy's Hospital Reports. No. i.	466 M.	26	Rt. Femoral (upper part)	Robust. Another aneurism in the opposite groin which disappeared spontaneously	External iliac tied s. . . .	Mr. Key.
	467 M.	36	Rt. Popliteal	After dragging a heavy coach felt pain and soreness in the ham. Coachmaker. Intemperate.	Femoral tied s. . . .	Mr. Key.
	468 M.	under 40	Popliteal	Miller . . .	Femoral tied s. The ligature removed after 72 hours—bleeding on the 11th day—recovery	Sir A. Cooper.
	469 M.	26	Lt. Popliteal	Robust labourer. Fell from a cart 5 weeks before	Femoral tied s. . . .	Mr. Key.
	470 M.	28	Rt. Popliteal	Bricklayer	Femoral tied s. . . .	Mr. B. Cooper.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Guy's Hospital Reports. No. i.	471 M.	30	Lt. Popliteal	Gentleman	The femoral, or a branch, first tied by Mr. Greaves, but pulsation continued—the femoral afterwards tied successfully by Mr. Cooper.	Mr. Greaves. Mr. B. Cooper.
Vol. xiii.	472 M.	50	Lt. Subclavian	Bargeman. Subject to long-continued straining of the muscles of the shoulder	Subclavian tied. Death on the 15th day—slight hemorrhage—disease of the chest	Mr. B. Cooper.
	473 M.	33	Rt. Popliteal	Plumber. Intemperate. When lifting a heavy piece of lead felt as if stabbed in the ham with a sharp instrument	Femoral tied s.	Mr. B. Cooper.
	474 M.	55	Lt. Popliteal	Carpenter. Intemperate. Fell into a saw-pit four months before and felt something give way in the thigh	Femoral tied s.	Mr. B. Cooper.
	475 M.	28	Lt. Popliteal	Porter. Had carried 3 cwt. —ten months before slipped with a heavy weight on his back	Femoral tied s.	Mr. B. Cooper.
	476 M.	34	Lt. External Carotid	Clergyman. Shot with his gun to the left shoulder	Common carotid tied s.	Mr. B. Cooper.
1844.	477 M.	32	Thoracic Aorta	Coal-porter		These 10 cases are published by Dr. Burdett in the Report of the Statistical Society of Guy's Hospital
	478 M.	38	Ditto . .	Stonemason		
	479 M.	52	Ditto . .	Stonemason		
	480 F.	50	Ditto . .			
	481 M.	40	Abdominal Aorta	Shoemaker		
	482 F.	30	Ditto . .			
	483 M.	30	Lt. Popliteal	Shoemaker	Femoral tied s.	
	484 M.	35	Ditto . .	Waterman	Femoral tied s.	
	485 M.	30	Ditto . .	Porter	Femoral tied s. just below the profunda	
	486 M.	60	Ditto . .	Railroad Labourer	Femoral tied s.	

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Guy's Hos- pital Reports. 1845.	487 M.	43	Rt. Popli- teal	Intemperate .	Femoral tied s. Died, 15 weeks after the operation, of delirium tremens	Dr. Notting- ham.
Provincial Med. & Surg. Journal. Vol. iii.	488 M.	38	Rt. Popli- teal	Waterman .	Femoral tied s. . . .	Mr. Teale.
	489 M.	55	Aortic arch		Burst into left bronchus after a blow	Dr. Martin.
	490 F.	55	Rt. Carotid	Lady	Carotid tied s. . . .	{ Mr. Key. Mr. Grouse.
Vol. v.	491 M.	55	Aortic arch		Compression of vena cava by the sac	Dr. Fletcher, P. S.
	492 M.	30	Ascending Aorta and Arch	Porter. Shaft of a cart forced violently against the chest—loud rasping sound	Serous effusion into the pericar- dium and pleuræ	Dr. Fletcher, P. S.
	493 M.	27	Abdominal Aorta	Striker for en- gine-work. Tumour dis- appeared when in the erect position —bruit de scie	Rupture into the peritoneal sac	Dr. Melson.
Vol. x.	494 F.	39	Ascending Aorta		Burst into a tubercular cavity in the lung	Dr. Blackiston, P. S.
	495 M.	36	Aortic arch	Medical man. Absence of the pulse in the arteries of the neck and upper extremities— loss of sight in the erect posi- tion—horse rolled on him 6 yrs. before	Burst into the trachea . . .	Dr. Durrant.
	496 M.	38	Rt. Popli- teal	Greengrocer. Great exertion in walking	Presse artère used—cure . .	Mr. Jolley.
Transact. of the Pro- vincial Asso- ciation. Vol. xii.	497 M.		Lt. Ingui- nal and Popliteal	Quay-porter .	External iliac tied s. . . .	Mr. James.
Medical Times. 1845.	498 M.	45	Ascending Aorta		Dissecting aneurism. Burst into the pericardium	Dr. T. Thomp- son, M. C. S.
	499 M.	32	Ascending Aorta		Dissecting. Burst into the peri- cardium	Dr. Jeffreson, M. C. C.
	500 F.		Abdominal Aorta	Affected with senile gan- grene	Dissecting. Death from exten- sion of the gangrene	Mr. C. Haw- kins, M. C. S.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Bright's Hospital Reports. Vol. ii.	501	M. 19	Middle Cerebral		Sac burst	Mr. Streeter.
	502	M. 45	Middle Cerebral	Paralysis. Mercurial cachexia	Torn artery not found . . .	Dr. Bright.
Dublin Medical Press. Vol. i.	503	M. 34	Lt. Popliteal	Rough rider .	Diffused aneurism. Gangrene. Amputation. Death from hemorrhage	Mr. Taggart.
Vol. ii.	504	M. 32	Lt. Popliteal		Dry sponge and bandage applied over the aneurism, the tumour nearly disappeared	Dr. Brunker.
Vol. iii.	505	M. 50	Aortic arch	Dysphagia. Dyspnoea. Pulse nearly imperceptible at the right wrist	Pressure on the trachea . .	Dr. Benson.
Vol. iv.	506	M. 26	Popliteal	Dredger . .	Spontaneous cure from inflammation of the sac	Dr. Laycock.
	507	M. 50	Lt. Axillary		Supposed cure	Dr. Mayhoad.
	508	M. 37	Abdominal Aorta, near celiac axis	Lancer. Exertion in raising a sack of oats 2 years before	Diseased heart. Sac entire .	Dr. Hunter.
Vol. vii.	509	M. 42	Temporal	Struck the temple against a wall	Leeches and cold lotion. Cure .	Dr. Benson.
Vol. viii.	510	M. 42	Aortic arch	Situated between the origins of the sterno c. mastoideus. Mistaken for carotid aneurism	Carotid tied above the tumour. Galvanism tried. The aortic aneurism burst into the mediastinum 7 days after the operation	Dr. O'Shaughnessy, Bengal.
Vol. ix.	511	M.	Femoral and Popliteal		Diffused aneurism. Ligature. Amputation. Aneurism in the groin cured by pressure	Dr. Duggan. Mr. McCoy.
Vol. x.	512	M. 28	Lt. Popliteal	Baker. Violent fall	Cured by pressure	Dr. Kirby.
Vol. xi.	513	F. 63	Ascending Aorta	Dyspnoea . .	Pressure on the right bronchus. Hydropericardium	Dr. Porter.
	514	M. 30	Ascending Aorta and Arch	Intemperate. External tumour. Double sound	Burst into the left pleura .	Dr. Bellingham, S. S.
	515	M. 30	Popliteal	Diseased heart	Aneurism cured by pressure. Sudden death from heart disease	Mr. Cusac.
	516	M. 31	Rt. Femoral (at the groin)	Sailor	External iliac tied s. . . .	Mr. Crosse.
Provincial Med. and Surg. Journal. 1846.	517	M. 40	Lt. Femoral (at the groin)	Sailor	External iliac tied s. . . .	Mr. Crosse.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Provincial Med. & Surg. Journal. 1846.	518 M.	28	Rt. Femoral (at the groin)	Sailor . . .	External iliac tied s. . .	Mr. Crosse.
1834.	519 M.		Popliteal		Femoral tied. Small artery divided. Mortification. Amputation. Recovery	Mr. Green, St. Thomas's.
1833.	520 F.	20	Posterior Tibial		Femoral tied s.	Mr. Tyrrell, St. Thomas's.
	521 M.	60	Both Carotids		One carotid tied April 15th, 1831. Return of pulsation in the sac	Mr. Green, St. Thomas's.
1844.	522 F.	26	Ascending Aorta	The tumour disappeared before death	Suffocation. No examination .	Mr. South, St. Thomas's.
	523 M.	31	Lt. Popliteal	When carrying a heavy weight felt a "rick" in the ham	Femoral tied s.	Mr. South, St. Thomas's.
	524 F.	46	Innominate and Descending Thoracic	Greengrocer. Accustomed to use the right arm a great deal in weighing coals, &c.	Attempted to tie the innominate, but found it aneurismal. Death on the 23d day. Pressure on the trachea	Mr. Key, Guy's.
	525 M.		Subclavian		Subclavian tied s.	Mr. Green, St. Thomas's.
	526 M.	32	Lt. Popliteal	Tailor. Not considered a fit subject for ligature	Cure by pressure	Mr. Storks.
	527 M.	37	Ascending Aorta	Coalheaver .	Burst into the pericardium .	Mr. South, St. Thomas's.
	528 M.	39	Descending Thoracic	Admitted for Pneumonia	Burst into the œsophagus .	Dr. Barker, St. Thomas's.
	529 M.	about 45	Basilar	Innkeeper. .	Apoplexy	The Author.
	530 M.	14	Anterior Cerebral	Fell whilst carrying a heavy weight	Rupture of the sac	The Author.
	531 M.	33	Aortic arch	Cornchandler. Temperate	Rupture into the trachea .	The Author.
	532 F.	50	Ascending Aorta	Labourer's wife. Temperate	Burst into the pleura	The Author.
	533 M.	64	Ascending Aorta	Surgeon. Bel-lows-sound. Blow on the chest	Pericarditis. Sac entire .	The Author.
	534 F.	54	Aortic arch	Labourer's wife	Rupture of the ascending aorta	The Author.
	535 M.	65	Descending Thoracic	Innkeeper. In-temperate	Burst into the left pleura .	The Author.

Authorities.	Sex.	Age.	Artery affected.	Habits, Occupation, supposed Cause, &c.	Operation, Termination, Cause of Death, &c.	Attendant.
Provincial Journal	536	M. 26	Lt. Popliteal	Brickmaker. Wheeling heavy loads of bricks	Femoral tied s.	The Author. Mr. Foster, St. Thomas's.
	537	M. 47	Descending Thoracic	Labourer. Intemperate	Rupture into the left pleura	The Author.
	538	F. 60	Lt. Common Carotid	Lady . . .	Case page 216 . . .	The Author.
	539	M. 43	Ascending Aorta and Arch	Sailor. No bruit. External tumour	Pressure on the trachea	Mr. Dalby.
	540	M. 59	Ascending Aorta and Lt. Popliteal	Carpenter. Intemperate. External tumour. No bruit	Sunk from small bleedings externally. Popliteal tied 12 years before s.	Mr. Statham.
	541	M. 31	Aortic arch	Gentleman .	Burst into the right pleura	Mr. Hicks.
	542	M.	Ascending Aorta	Anxious to go to work ten days before his death	Burst externally . . .	Birmingham, P. S.
Monthly Journ. of Med. Science.	543	M. 32	Both Popliteal	Baker. Carried heavy weights on his head	Both femoral tied s. . .	Mr. Syme.
Dublin Medical Press.	544	M. 46	Abdominal	Labourer. Twenty years before a cart passed over the lower part of the abdomen—single rough bellows-sound	Burst into the left pleura	Dr. Bellingham.
	545	M. 37	Abdominal	Coachman. single rough bellows-sound	Sac hourglass-shaped and entire—death from dropsy	Dr. Bellingham.
Lancet. 1846.	546	M. 33	Rt. Femoral	Sailor. Accustomed to lift heavy weights	Cure by pressure . . .	Mr. Mackern.
	547	M. 24	Lt. Popliteal	Brewer. Leg crushed between 2 casks	Cure by pressure . . .	Mr. Storks.
	548	M. 48	Rt. Femoral (at the groin)	Felt something give way in the groin when lifting a heavy weight two years before	External iliac tied s. . .	Mr. Gay.
Medical Gazette.	549	M. 45	Ascending Aorta	Gentleman .	Rupture into the pericardium. Dissecting aneurism	Dr. T. Thompson.
Dublin Journal.	550	M. 29	Rt. Popliteal	Tailor. . .	Cure by pressure . . .	Mr. Porter.
	551	M.	Popliteal	Physician. Sprained the ham when alighting from a carriage	Cure by pressure—the pulsation ceased a month after the pressure had been withdrawn	Mr. Porter.

CHAPTER XXI.

ARTERIO-VENOUS ANEURISM.

It sometimes happens that a spontaneous communication is formed between the aneurismal sac and the neighbouring vein : five cases are related in the Table (222, 230, 334, 338, 422) ; four of these were in the aorta, and one in the common iliac. The general signs attending this form of aneurism, when occurring in the aorta, have been so well described by Mr. Thurnam, in the 23d volume of the Medico-Chirurgical Transactions, that I shall offer no apology for inserting them. He says,

“After the preceding analysis of the symptoms, and view of the pathology, I think we shall be justified in regarding the following as the diagnostic signs of spontaneous varicose aneurism of the aorta.

General signs.—1. Severe and rapidly-advancing anasarca of such portions of the body as are below, or the venous system of which is distal to the varicose orifice. When the varicose aneurism is between the descending aorta and inferior cava, the legs, scrotum, and lower half of the body, and when between the ascending aorta and one of the right or left cavities of the heart, or the pulmonary artery, the whole of the body is the seat of the dropsical effusion.

2. Livor of the face particularly, but likewise in a less degree of all such portions of the body as are below the varicose orifice.

3. A distended, and even varicose condition of the subcutaneous and other veins distal to the orifice.

4. Dyspnœa; often amounting to orthopnœa and terminating in apnœa.

5. Cough, with expectoration; especially if the sputa be bloody.

6. A remarkably jerking, and in some cases very feeble pulse.

7. Emaciation, debility, loss of muscular power, deficient animal heat, and sensorial disturbance, may be looked upon as somewhat less frequent and certain signs.

Physical signs.—8. A superficial, harsh, and peculiarly intense sawing or blowing sound, accompanied by an equally marked purring tremor, heard over the varicose orifice, and in the current of the circulation beyond it. This sound is continuous, but is loudest during the systole, less loud during the diastole, and still less so during the interval.

The characters of the sound, as regards intensity and continuousness, will, probably, altogether distinguish it from any that is heard in ordinary cases of aneurism, or valvular disease of the heart. In the case of a varicose communication between the aorta and superior cava, or right auricle—when there is no displacement of the heart—the sound will be heard and the tremor felt along the right border of the sternum, and will generally be the loudest about the second right intercostal space. When, however, the aneurism opens in the pulmonary artery, or summit of the right ventricle, the corresponding points on the left side will be the seat of the murmur, though this may probably sometimes be heard more distinctly near to, though still to the left, of the centre of the sternum. When the history shows that the foregoing signs have been developed soon after some unusual effort, especially if that were attended by pain in the præcordial region, and a disposition to syncope, the evidence of a varicose aneurism of the ascending aorta is rendered nearly indisputable.”

CHAPTER XXII.

DILATATION OF ARTERIES.

DILATATIONS of arteries, when partial, have been described under the head of aneurism. It not unfrequently happens, however, that the caliber of an artery is uniformly enlarged to a considerable extent, without breach of continuity in its parietes. These dilatations may conveniently be divided into two kinds: first, those in which the coats retain their natural thickness; and secondly, the dilatations accompanied with considerable tortuosity and thinning of the coats, and which have been de-

scribed as aneurisms by anastomosis. The first class of cases occur generally in the aorta, and in the large arteries of the limbs, and do not require surgical treatment. These dilatations are most frequent in the ascending aorta. Munroe believed that this part of the vessel, in old people, was seldom free from enlargement. I am induced to think that dilatations of the ascending aorta are not so frequent as many writers suppose. I had not kept an accurate account of the caliber of the aorta previous to the investigations which form the Table of Arteries. Of the 102 cases there recorded, the ascending aorta was dilated¹ only in three. Sometimes the ascending part of the vessel is enlarged to a great extent; several specimens of this kind are to be seen in the London museums. The symptoms attending these dilatations, will depend much upon the size of the aorta, and the roughness or smoothness of its inner membranes and valves. If the valves be not sufficiently extended to prevent the return of blood into the ventricle, a loud bellows-sound will be heard (more or less roughened according to the irregularity or consistency of the surface over which the blood flows). Purring tremor is also frequently present; and occasionally a rough murmur is perceptible in the back and upper part of the sternum.

The arch, descending thoracic and abdominal aorta are also subject to these enlargements, and next to the ascending thoracic, the lower part of the abdominal (often including the iliaes) is the most frequent seat. Dilatation of the arteries of the second order is not uncommon, and has not unfrequently been mistaken for aneurism. I have lately seen a case of fusiform enlargement in the axillary artery which occasioned great embarrassment in the diagnosis. Simple dilatations of the carotid artery have frequently been considered aneurismal. The following is an interesting example of the great amount of pulsation which slight dilatation of an artery may occasion.

A lady, æt. 69, had been under the care of my friend Mr. Iliff, of Kennington, for several months, with symptoms of dyspnœa and slight dropsical effusion into the pleura and peri-

¹ In the other cases it is possible that some pathologists would have considered the aorta slightly dilated, but I do not include the doubtful cases, believing it to be of no practical importance whether the vessel is one or two lines wider than natural.

toneal cavities. A strong pulsatory movement was present under the right clavicle, over the seat of the innominata. The pulsation was so violent that the patient's attention was constantly directed to it, and it frequently kept her from sleeping. It was supposed that she laboured under aneurism of the arch of the aorta; this was rendered more probable by the dyspnœa which existed before her decease. Mr. Iliff kindly permitted me to examine the aorta and its branches after death, and the only important morbid change I could discover was an oblong bony plate about three quarters of an inch in length and half an inch in thickness, near the bifurcation of the innominata. At this part there was a slight dilatation of the vessel opposite to the bony concretion; the aorta and its thoracic branches were otherwise free from ossific deposit. The heart normal.

The uniform increase of the caliber of an artery is, I believe, more frequently occasioned by mechanical causes than by disease of the arterial tunics, the coats of the artery gradually losing their elasticity by constant stretching, induced by the increased impetus of the blood, as well as by an obstructing cause on the distal side of the enlargement. Thus, in aneurisms of the arch and descending thoracic, the ascending aorta is often dilated. In Case 5, page 148, where the femoral artery had been tied twelve years before, the common iliac, external iliac, and femoral as far as the profunda, were greatly increased in diameter. In some instances, the arteries appear to be dilated during life, but are not found so after death. In Case 86 (Table of Arteries) the patient directed my attention to a strong pulsatory movement in both groins, and I expected to have found the iliacs and upper part of the femorals considerably dilated; the former arteries were tortuous; their caliber but a little, if at all, increased. When dilatation occurs in the ascending aorta, the same treatment may be adopted as recommended in disease of the aortic valves.

In the second division of dilatation of arteries, there is great expansion of the arterial tube, and the coats are much reduced in thickness; the vessels are also elongated and tortuous; a pulsatory movement is generally felt, and there is a great disposition to hemorrhage. Various terms have been applied to this condition of artery. John Bell was the first who described it as aneurism by anastomosis; the terms *nævus*, morbid erec-

tile tissue, branching and circoid aneurism, aneurismal varix, and aneurism of bone, have likewise been used to designate what I believe to be only modifications of the same disease.

Nævus, or capillary aneurism is formed by dilatations of the smaller vessels; it is generally of a dark red colour, seldom, if ever, attended with pulsation, and but rarely attains a large size; it is mostly congenital. Numerous methods have been adopted for the removal of these tumours; caustics, injections, setons, pressure, incision, the introduction of needles, vaccination, and ligature, have all been tried in turn and with varied success. I have seen three instances in which nævi on the scalp have disappeared spontaneously; and it is probable that many of the smaller tumours do not require surgical assistance. In two cases I have tried vaccination without any apparent benefit. The plan recommended by Mr. Liston¹ I believe to be the preferable mode of treatment. It consists in the introduction of a common suture needle armed with a double ligature. The loop is cut, and one portion tied on each side; if necessary a second needle may be used. I have adopted it on three occasions with success. The nævus in one female infant was of large size and seated in the upper part of the chest; the disease was entirely removed, and only a very slight scar remains.

Circoid aneurism is a more dangerous variety of this disease and often baffles the skill of the surgeon. Like capillary aneurism, it is generally seated in the upper part of the body. It is often rapid in its growth and sometimes attains a large size, and has mostly a pulsatory movement. In Dr. Mussey's patient (26), the temporal artery could be seen to pulsate fifteen feet from the bed. The vessels become large, thin, and transparent. In Dr. Maclachlan's case (21), the branches of the carotid were found to have degenerated into dilated tubes of extreme thinness and transparency. The brachial artery in Dr. Laurie's patient (15), was as large as the little finger; and in the man upon whom Mr. Perry (5) operated, the femoral artery was the size of the abdominal aorta. Sometimes the main arteries are not dilated, and the tumour is made up of a congeries of small vessels; in other examples it has a cellular, sponge-like appearance. The subjoined Table comprises the greater number of the important cases of this kind on record.

¹ Practical Surgery, second edition, p. 296.

Authorities.	Sex.	Age.	Part affected.	Operation, Remarks, &c.	Attendant.
Medico-Chi- rurg. Trans- actions. Vol. ii.	1 F.	34	Left Orbit	Felt a sudden snap in the forehead—carotid tied—cure	Mr. Travers.
Vol. vi.	2 F.	44	Orbit . .	Carotid tied—cure	Mr. Dalrymple
Vol. ix.	3 F.	21	Ring finger	Radial and ulnar tied by Mr. Hodgson, afterwards a circular incision made by Mr. Lawrence, with benefit	Mr. Lawrence.
Vol. xv.	4 F.	5	Forehead.	Blow. Ligature of the base—cure	Sir B. Brodie.
Vol. xx.	5 M.	47	Leg . .	The knee injured several years before. Femoral tied—death from hemorrhage six days after the operation	Mr. Perry.
Vol. ix.	6	Infant	Back of the neck	Death occurred during the removal of the tumour	Mr. Wardrop.
	7	Infant	Chest . .	Carotid tied. Death 13 days after the operation from exhaustion produced by ulceration of the tumour	Mr. Wardrop.
Freer's Obser- vations on Aneurism. Lancet. 1827.	8 M.	Young	Mouth .	Removed by excision	Mr. Freer.
1829.	9 M.	22	Temple .	Temporal and carotid arteries tied. Tumour not reduced—death two months afterwards from another cause	Mr. Wardrop.
	10 M.	mid. aged	Eyelid .	Tumour burst—three pints of blood lost—the carotid tied, and the day after an incision was made into the tumour, and bleeding occurred to the amount of 5 pints—cure	Dr. Arendt, St. Petersburg
Medical Gazette. Vol. vi.	11 M.	19	Upper lip, nose, and forehead	Treated by needle and ligature—successfully	Mr. Liston.
Vol. xviii.	12	20	Upper lip	Removed by incision s.	Mr. Arnott.
Vol. xvi.	13 F.	41	Little and ring fingers	Duration 5 years—ulnar artery tied unsuccessfully—the fingers amputated—cure	Mr. Russell.
1843.	14 M.	53	Side of the head	Blow 20 years before—both carotids tied—cure—considerable hemorrhage from the tumour after the second operation	Dr. Kuhl.
	15 M.	21	Arm, fore- arm, and hand	Brachial and ulnar arteries tied—the disease benefited, but not cured	Dr. Laurie.
	16 F.	23	Temple .	Congenital. Common carotid tied—cure	Dr. Auchin- closs.
Dublin Journal. Vol. xi.	17	15 mths.	Cheek. .	Congenital. Common carotid tied—cure—death four months after the operation from convulsions	Dr. Zeis, Dres- den.
Vol. xxiii.	18 F.	26	Rectum .	Cured by the application of nitric acid	Dr. Houston.
Edinburgh Med. & Surg. Journal. Vol. xxxi.	19 F.	50	Side of the head	Posterior aural tied—the tumour afterwards cut out—cure	Mr. Syme.
1844.	20 M.	67	Side of the neck	Thirty years before a swelling appeared about the size of a pea, after a fit of coughing—carotid tied, the tumour diminished—death nine months after the operation from pneumonia	Dr. Kerr.

Authorities.	Sex.	Age.	Part affected.	Operation, Remarks, &c.	Attendant.	
Glasgow Med. Journ. No. ii.	21	M.	30	Side of the head	Carotid tied—death on the 4th day from pleuritis	Dr. Maclachlan.
Med. and Phys. Journ. Vol. xlviii.	22	Boy	Left side of the neck	Two incisions made into the tumour, and death instantly occurred—very little blood lost	Dr. Klein, Stuttgart.	
	23		Face . .	Tumour as large as a child's head—ligature of the carotid and partial removal of the tumour with the trephine—reported cure	Mr. Pattison, Maryland.	
Gibson's Institutes of Surgery.	24	F.	25	Rt. side of the head	Four months pregnant—incisions made round the tumour at intervals, and the arteries tied—cure	Dr. Gibson.
	25	M.	Head . .	Occipital artery first tied, then the same treatment pursued as in the above case—cure	Dr. Gibson.	
American Journal of Med. Sciences. 1830.	26	M.	20	Head . .	Congenital. Left carotid tied, afterwards the right—the tumour decreased, then increased again, and was removed by the knife—forty ligatures were used	Dr. Mussey.
1840.	27	M.	23	Lip and tongue	One carotid tied, then the other—the tumour considerably reduced—the remaining part removed by pressure and incision	Dr. Warren.
Dupuytren, Clinique Chirurg. Tom. iv.	28	M.	20	Ear . .	Congenital. The temporal and auricular arteries tied, then the occipital, and afterwards the carotid—the disease arrested, but not cured	Dupuytren.
	29	M.	40	Lip . .	Blow when nine years of age. Two coronary arteries and a branch of the labial first tied; then pressure used	Dupuytren.
	30	M.	8 mths.	Foot . .	Congenital. Cured by cauterization (le nitrate acide de mercure)	Dupuytren.
	31	M.	8	Lip . .	Congenital. Cure by extirpation . . .	Dupuytren.
	32	M.	43	Head . .	Appeared at an early age—fever—frequent bleedings—death—puncture made with a bistoury	Dupuytren.
Cloquet's Pathol. Chirurg.	33	M.	16	Cheek . .	Had existed 6 or 7 years—removed with the knife and the application of nitrate of silver	Dupuytren.
	34	M.	15	Lip . .	Commenced at an early age—cured by excision	Dupuytren.
Pelletan, Clin. Chirurg. Vol. ii.	35	F.	18	Side of the head	Temporal artery tied; the occipital transfixed with a needle—death on the 14th day from overfeeding	Pelletan.
	36	M.	25	Side of the head	No operation	Pelletan.
	37	F.	15	Forehead.	Tumour divided—great hemorrhage—death on the 4th day	Moreau.
	38	M.	11	Scrotum .	An incision made over the whole length of the tumour—great hemorrhage—death	
Bell's Principles of Surgery	39	F.	25	Between the rectum and vagina	Increased during pregnancy	John Bell.
	40	M.	25	Forehead.	Arteries tied and an incision made into the tumour—the part successfully removed nine months afterwards by Bell	Bell.
	41	M.	5	Temple .	Congenital. An incision made into the tumour and the bleeding stopped with much difficulty	Bell.

Authorities.	Sex.	Age.	Part affected.	Operation, Remarks, &c.	Attendant.
Bell's Principles of Surgery.	42	M.	Nates . .	Blow on the ischium	Bell.
	43	F. 25	Knee . .	Of 12 years' duration. Partially removed 3 years after its first appearance; and 7 years from this period it was entirely removed, it having attained a large size—result doubtful	Bell.
	44	F. 24	Chin . .	Congenital. Ligature applied	Desault.
	45	F. Young	Palate .	Incision. Exfoliation of the palate . .	Mekren.

Of the 45 cases, 24 were males, 16 females, and the sex in five is not stated. Their ages, at the time of operation, were as follows, but in many the disease was congenital, and in the greater number it had existed for several years: 4 were under five years of age; 3 between five and ten; 8 between ten and twenty; 15 between twenty and thirty; 3 between thirty and forty; 5 between forty and fifty; 2 between fifty and sixty; 1 between sixty and seventy; and in four cases the age is not stated.

The disease in 38 was seated in the head, neck, and upper extremities. The lower part of the rectum, perineum, nates, scrotum, leg, knee, and foot were affected in the remaining seven. 22 were cured, 6 benefited, 11 died after the operation, and four are not reported to have been operated upon.

Treatment.—The three methods usually resorted to for the cure of this disease are, strangulation of the tumour by ligature, excision, and the tying of the main artery.

If the tumour is not of large size, the first method should, I think, be tried, and I believe that in many cases where more formidable measures have been had recourse to, this plan of treatment would have succeeded.

If extirpation be practised, the advice given by John Bell “not to cut into the tumour but to cut it out,” cannot be too earnestly impressed upon the operator; four instances of death from the neglect of this precaution are mentioned in the Table.

The ligature of the carotid appears to have been attended with greater success in this class of cases, than when the vessel has been tied for hemorrhage, or circumscribed aneurism.

Thus, this artery was ligatured sixteen times; and in three patients both carotids were tied. The ligature alone was successful in five cases; in seven operations benefit was derived from the tying of this vessel, and the disease was afterwards removed by pressure, caustic, or excision. In the three fatal cases, the patients did not appear to die from the immediate effects of the operation.

Although the ligature of the common carotid (when the disease is seated in the head and face) does not, in the majority of instances, of itself effect a cure, yet it is probable that by reducing the supply of blood to the tumour, the caliber of the artery is so diminished that excision and other means may be employed with a better chance of success.

Aneurism of Bones.—When this disease occurs in bony structures, it is more likely to be mistaken for aneurism, and I find several recorded cases where the subclavian, brachial, femoral, and external iliac arteries have been tied under the belief that circumscribed aneurismal dilatations existed. Whilst the former varieties are more frequently seated in the upper parts of the body, this disease occurs generally in the bones of the lower extremities, and the cancellated structure of the head of the tibia, is its most common situation; it likewise commences at a later period of life than when seated in the integuments. Sometimes, as in the foregoing variety, the arteries and veins are much dilated; in other instances, the growth is spongy and erectile, the smaller vessels being chiefly implicated. The blood finds its way into the cancellated structure of the bone, the cells enlarge, and the tumour increases in size, in some cases slowly, in others with great rapidity; a pulsatory movement, produced by the distension of the cellular and erectile tissues, is present at each systole of the ventricle. The cells vary in size from a pea to an orange; a bellows or whizzing sound is generally heard; and this, combined with the pulsation, renders the diagnosis extremely difficult. Of 25 cases of this disease which I find on record, 19 occurred in males, and 6 in females. Their ages were, 2 under twenty; 4 between twenty and thirty; 5 between thirty and forty; 5 between forty and fifty; 2 between fifty and sixty; 1 between sixty and seventy; and 6 not named. The pelvis was the seat

of the affection in one patient ; the femur in five ; the tibia in thirteen ; the metatarsal bone of the second toe in one ; and the humerus in five. Five of these were cured by operation, and one was benefited ; five died after amputation ; five after the ligature of the main artery ; four after ligature and amputation ; four died without operation ; and in two, whose limbs were removed, the result is not known.

The foregoing statement presents a frightful picture of the mortality of this disease, and leaves us to expect but little benefit from surgical treatment. The question of most importance connected with the treatment of these tumours is, the propriety of first tying the main artery of the limb. In the five successful cases, the artery was ligatured in one ; amputation alone was performed in three ; and in the fifth the artery was first tied without much benefit, and the limb subsequently removed.

Fungus hæmatodes has been considered by some to bear a great resemblance to the tumours above described. Although I cannot discover any striking analogy between the diseases, I think that fungus hæmatodes must be classed amongst the vascular growths, and therefore a brief allusion to it may not be thought out of place. In 1840 I was engaged in writing a paper on *Fungus hæmatodes* (which I intended to have read at the Medical Society of London), and with some considerable labour I formed a Table of Cases, from the English, French, and American journals ; the paper was not finished ; but I think the following abstract will be interesting as forming a comparison with the preceding Table. The cases comprise¹ 88 males and 54 females ; their ages as follow : 7 under one year ; 9 from one to five ; 12 from five to ten ; 8 from ten

¹ Cooper, in his *Surgical Dictionary*, says, "I am not aware of any records by which a judgment might be formed of the comparative frequency of the disease in the two sexes." Dr. Kerr, in the *Cyclopædia of Practical Medicine*, remarks, "Observations are wanting to enable us to decide whether it is more prone to manifest itself in one sex than the other, although the last-mentioned observations with the recorded experience of this and cancerous diseases are favorable to the supposition that females are more subject to it than males." Dr. Copeland, in his *Dictionary of Practical Medicine*, observes, "As to the influence of sex, sufficient data have not been furnished to admit of an opinion, but the most of the cases which I have seen have occurred in males."

to fifteen; 11 from fifteen to twenty; 21 from twenty to thirty; 14 from thirty to forty; 19 from forty to fifty; 14 from fifty to sixty; 6 from sixty to seventy; 2 from seventy to eighty; 1 from eighty to ninety; and in 18 the age is not stated.

The parts affected were, the eye, 33; upper eyelid, 2; brain, 3; parietal bone, 1; face, 1; jaw, 4; tongue, 1; neck, 3; shoulder, 3; axilla, 2; arm, 5; fore-arm, 4; elbow, 2; hand, 1; breast, 8; lungs, 1; abdominal viscera, 4; liver, 3; kidneys, 2; bladder, 4; spleen, 1; uterus, 2; pelvis, 2; pubis, 2; loin, 1; spine, 1; prostate, 1; parotid gland, 1; scrotum, 1; testicle, 14; hip, 2; thigh, 10; knee, 2; leg, 8; tibia, 4; ankle, 2; various parts, 2. A careful examination was not generally made of the internal organs. In seventy-three cases the disease was seated in the head, neck, and upper extremities; forty-two in the thorax and abdomen, including the testicle; and twenty-eight in the lower extremities. It will be seen from the foregoing abstract, that fungus hæmatodes differs materially from circoid aneurism; its greatest resemblance consists in its rapid growth, its prevalence in young subjects, its frequent occurrence after an injury, its tendency to hemorrhage, and the dilatation and transparency of the smaller vessels. On the other hand, circoid aneurism seldom, if ever, affects the abdominal and thoracic viscera, and is rarely met with in the lower half of the body; secondly, it is not, like fungus hæmatodes, liable to return after operation, or to affect other parts; thirdly, the soft cerebriiform matter, so frequently present in fungus hæmatodes, is not usual in circoid aneurism, and pulsation is of unfrequent occurrence in the former disease.

Dupuytren¹ speaks of some cases of fungus hæmatodes, in which a pulsatory movement has been observed; the structure also resembled the erectile tissues. Hasse² says, "Fungus hæmatodes may be said to correspond in anatomical structure with erectile tissue, except that we can no longer discriminate the venous or arterial portions, or the canals and pareties of vessels; the whole, indeed, more closely resembles a network of dirty red cells and meshes."

¹ Clin. Chir. tom. iv.

² Swain's Translation, p. 105.

CHAPTER XXIII.

ULCERATION OF ARTERIES.

THE ulcerative process is seldom met with except as the result of ligature. It sometimes takes place in simple and malignant ulceration of surrounding parts, gun-shot wounds, abscesses, and external injuries of various kinds. In August 1844, I saw a case of malignant ulceration of the groin in St. Thomas's Hospital, under the care of Mr. Mackmurdo, where repeated bleedings occurred, which were stopped for a time by the application of astringent lotions (saturated solutions of alum), and by long continued pressure; but as the ulceration proceeded, hemorrhage again took place, and the man gradually sunk from exhaustion, produced by frequent losses of blood. In this case bleeding occurred from some of the smaller branches of the femoral or profunda, as the main artery was found entire.

In plague buboes, ulceration of the femoral artery has not unfrequently happened. A successful case of ligature of the external iliac, in which hemorrhage took place from this cause, is related in the 'Lancet' for 1839, by Mr. Laidlow. Mr. Green attempted to tie the femoral artery in a patient of Mr. Cline's who had bleeding from sloughing bubo. The preparation (597) is in the St. Thomas's Hospital Museum, and was described as one of ulceration of the femoral artery. On a careful examination, however, with Mr. Adams, the curator of the Museum, we found the root of the external pudic ulcerated, and the femoral sound. It is, I think, probable that many bleedings which are thought to arise from the main trunk, originate from the smaller branches. Hennen¹ mentions a case of ulceration of the external pudic and femoral arteries from sloughing bubo in the groin. A large quantity of blood was lost; the external iliac artery was tied; gangrene followed; the thigh was amputated close to the trochanter, and the man recovered.

In the College Museum, preparation 1718, is an example

¹ Hennen's Military Surgery, p. 188.

of ulceration of the femoral artery from chimney-sweep's cancer. In the Chatham Museum is an instance of ulceration of the internal carotid artery, produced by abscess at the base of the skull; fatal hemorrhage took place into the pharynx. There is also one of ulceration of the brachial artery from the effects of ligature. In the King's College Museum (563) there is an ulceration of the lingual artery.

Occasionally in ulceration of the stomach, the arteries are opened by this process. A few fatal cases are on record; one is published in the sixth volume of Guy's Hospital Reports, and Hodgson relates another.

This form of hemorrhage, when occurring externally, must be treated by compress and bandage; and if these means do not succeed, the artery should, if practicable, be tied above the seat of hemorrhage, or a ligature in some cases may be applied above and below the ulcerated opening.

Several cases of fatal hemorrhage from phagedænic ulceration of the throat and fauces, occurring generally in children after scarlatina, are on record. Messrs. Mayo and Luke have ligatured the carotid successfully in two cases of hemorrhage from ulceration of the fauces. Fatal bleedings have also occurred from hard bodies thrust into the fauces. I find three instances of death from persons falling with tobacco-pipes in their mouths. Hemorrhage did not take place at the time of the accident, but occurred some days after, probably from ulceration of the artery.

It sometimes happens that ulceration of an artery takes place from the formation of pus in its immediate vicinity, the blood being discharged into the cavity of the abscess. An interesting case of this kind occurred to Mr. Liston. It is published by Mr. Liston with eight others which bear some resemblance to it. In four cases the disease was seated in the neck, in three it occurred in the thigh, and in one the radial artery was affected. The following is an abbreviated history of Mr. Liston's case. A boy, nine years of age, pallid and of diminutive stature, was admitted into the University College Hospital, October 20th, 1841, for a small swelling below the right ear, observed two months before his admission; during this time it had increased, and was irregular in shape, with slight fluctuation; Mr. Liston, taking the age of the boy into

account, as well as the absence of bellows-sound, supposed it contained pus, and made an opening into the swelling with a lancet, a gush of arterial blood followed; the wound was closed, and the carotid artery tied the next day; the boy died fifteen days after from hemorrhage. On dissection the proximal end of the artery was found open; the distal end closed by a firm coagulum. On the anterior surface of the tumour could be traced the carotid artery, free, to within three quarters of an inch of its division, where it became firmly connected with the swelling. The coats of the vessel were not dilated at the part where it was connected with the tumour. The tumour contained a large quantity of grumous blood; a probe was passed down the internal carotid, and entered the cyst just opposite the common carotid. The opening by which the cyst had communicated with the artery was about three lines wide, and two and a half long, and was situated at the bifurcation of the common carotid. This opening was closed by a firm clot.

This case is denominated one of false aneurism by Mr. Liston; the coats of the artery were destroyed by ulceration, and a communication thus formed with the sac of the abscess. The age of the boy and the appearance of the tumour, naturally led to the belief that it was a scrofulous abscess. The case is instructive, as showing the importance of making an exploratory puncture with a grooved needle before the introduction of the lancet.

In November 1845, I saw the following interesting case in St. Thomas's Hospital, under the care of Mr. Mackmurdo, the notes of which are supplied by my friend Mr. Adams. I shall only give the outlines, as it is likely to be brought before the Medico-Chirurgical Society. A man, 27 years of age, was admitted Nov. 30th, 1845, for small bleedings from two openings in the neck, which appeared to be connected with scrofulous abscess. He had been in the hospital seventeen months before with strumous enlargement of the glands on the right side of the neck. When he left, his health was improved; but he was again admitted some time after this for an abscess in the neck, which was opened; he had also a troublesome cough and fetid nasal discharge, and his speech was often so affected that his words were scarcely intelligible. The bleeding before spoken of was soon arrested; but he returned in three hours,

having lost a large quantity of blood per saltum (three or four quarts). The bleeding was stopped by compress, &c. December 1st, the hemorrhage recurred, and the wound was dilated for the purpose of endeavouring to secure the bleeding vessel. A profuse gush of blood followed; this was stopped by the introduction of the fingers into what was thought to be an aneurismal sac. Mr. Mackmurdo at once put a ligature on the common carotid; the patient went on tolerably well, with the exception of a troublesome cough (which had existed before the operation), until the evening of December 5th, when about five ounces of blood were lost from the original wound. The hemorrhage was arrested by sponge dipped in a saturated solution of alum, and the application of pressure. Bleeding to a small extent occurred on the 6th, and he died the following day apparently from exhaustion.

Post-mortem examination.—The right lung was slightly studded with tubercles, the left healthy. At the bifurcation of the common carotid, the arterial tube, with the exception of a small slip connected with the external carotid, was separated by ulceration from the common and external carotids. The orifice of the internal carotid was contracted and plugged with coagulum, and terminated above in a sac close to the base of the skull, about an inch and a half in diameter, into which the internal jugular vein opened from above. The lower portion of the vein was impervious a little below the sac.

In this case I apprehend that an abscess had formed in the neighbourhood of the vessels, after a time destroying their coats, and producing the arterio-venous communication above described. The man had lost a large quantity of blood before the ligature of the artery, and this combined with the subsequent small bleedings and the tuberculated condition of lung was sufficient to sink him. Could the exact condition of the parts have been known, the ligature of the carotid before the first bleeding might possibly have saved the man's life.

CHAPTER XXIV.

RUPTURE OF ARTERIES.

THE rupture of an artery may occur spontaneously or from violence ; rupture of the smaller arteries of the integuments generally takes place from blows, contusions, fractures, or great bodily exertion. The cerebral arteries which, in some respects, differ from the arteries of the trunk and limbs, are most frequently affected with this lesion, which has been already described at page 74. The branches of the pulmonary artery are probably the next in order ; indeed, pulmonary hemorrhage is more frequent than cerebral, but it must be recollected that in many instances of bleeding from the mucous surfaces, the blood escapes from a large extent of surface and not from one vessel. I have seen two fatal cases of hæmoptysis, where, after a careful examination after death, no abrasion, nor the slightest vestige of a ruptured vessel could be discovered.

Rupture of the middle meningeal artery not unfrequently takes place from falls or blows on the head. This artery bears some resemblance in structure to the dura mater itself ; it possesses but little, if any, elasticity ; is in close contact with the bones of the skull, and is, moreover, received into a kind of groove in the dura mater, so that if the artery be removed a depression will be left in this membrane as well as in the bone.

The following case occurred to me in 1838, and, as it presents a good example of the effects of rupture of this vessel. I will give the outlines. February 3d, between the hours of three and four a.m., I was called to Mr. C. Carpenter, Walworth, æt. 55, whom I found dead. There was a slight abrasion of the skin, nearly over the coronal suture, about two inches on the left of the mesial line, and considerable tumefaction on the eyelids of the same side, with ecchymosis as if from a blow with the fist : no other marks of violence were visible. The man was described as having been brought home

in a state of intoxication a short time previous by a fellow-workman : he was said to have had a fall, but refused to have any medical assistance ; complaining only of pain and stiffness of the left shoulder, which he said would be all right in the morning. He spat a little blood (probably from the nose) and went to bed. About half an hour after this his wife found him dead.

I examined the body, sixty-seven hours after death, with my friend Mr. Webber. On detaching the scalp, a small quantity of blood was found to have been effused between it and the calvarium, the situation of which corresponded with the abrasion of the skin, and on removing the calvarium, a coagulum of blood (about $\frac{3}{4}$ iv) was discovered underneath the same spot, between the dura mater and the skull, the left hemisphere of the brain being much flattened by the pressure to which it had been subjected. This effusion had proceeded from the middle meningeal artery, which was found ruptured immediately after its entrance into the cranium. The vessels of the brain were much congested, particularly in that part of the right hemisphere which was contiguous to the seat of injury ; a small quantity of fluid in the ventricles ; the thoracic and abdominal viscera healthy ; the stomach contained a small portion of food in a half-digested state ; a part of the mucous membrane was reddened.

In Hennen's 'Military Surgery' (p. 329), a case is related of extravasation of blood from the rupture of the meningeal artery. The trephine was used, the blood removed, and the patient recovered. There was an irregular appearance of the right parietal bone, but no fracture or depression could be discovered.

Sir Benjamin Brodie¹ believes that rupture of this artery is very rare, except as a consequence of fracture, and says " blood is seldom poured out in any considerable quantity between the dura mater and the bone, except in consequence of a laceration of the middle meningeal artery, or one of its principal branches ; and it is very rare for this accident to occur, except as a consequence of fracture. If, therefore, we find the patient lying in a state of stupor, and, on examining the head, we discover

¹ Medico-Chirurgical Transactions, vol. xiv, p. 385.

a fracture with or without depression, extending in the direction of the middle meningeal artery, although the existence of an extravasation on the surface of the dura mater is not thereby reduced to an absolute certainty, it is rendered highly probable; and the surgeon, under these circumstances, would neglect his duty if he omitted to apply the trephine: and where no fracture is discoverable, yet, if there is other evidence of the injury having fallen on that part of the cranium in which the middle meningeal artery is situated, the use of the trephine may be resorted to on speculation, rather than that the patient should be left to die without an attempt being made for his preservation."

Mr. Liston,¹ on the other hand, thinks that it is "very doubtful whether you ought to subject your patient to an operation in such a case."

The trephine has been used in several instances in which this artery has been ruptured, but there are but few cases on record where the result has been successful, although the lives of some patients appear to have been prolonged by the operation.

Mr. Abernethy² relates three cases of rupture of this artery, accompanied with fractures of the skull, where he used the trephine: his patients died, and he observes, "It can scarcely be doubted, then, that if the operation had been performed in these cases as soon as it became necessary, when perhaps one, instead of many ounces of blood were poured out from the torn vessel, the lives of the patients might have been preserved."

It is questionable, I think, whether the early removal of the bone (if the nature of the accident were known) would have a good effect unless the ends of the artery could be secured; for, it must be recollected, that the cessation of hemorrhage in these cases only takes place after a certain amount of blood has been lost; and the pressure from this extravasated fluid is probably the cause of the suppression of the bleeding. This is well exemplified in a case which occurred to Dr. Ducachet, of Baltimore, who, after removing the coagulum, could not

¹ Lectures, *Lancet*, 1834, p. 367.

² *Surgical Observations*, p. 45.

stop the bleeding vessel. The artery, in this instance, was pierced by a spiculum of bone.

The arteries of the limbs seldom rupture spontaneously, and when these lesions occur, the subjects are of advanced age, and the vessels in a diseased condition. Rupture of the inner and middle coats, from violence or over-exertion, is very frequent, as I have observed when speaking of aneurism. Sometimes all the coats are either wholly or partially torn across, and the blood is effused into the cellular membrane and adjoining parts, and a false aneurism is produced. A good specimen (No. 24) of rupture of the popliteal artery is in St. Bartholomew's Museum. The artery is completely divided, and the sac, as large as an orange, is formed by the surrounding cellular tissue. Nothing is known of the history of the patient. There is a ruptured popliteal artery produced by the falling of a bar of iron (25 cwt.) on the ham, in the Museum of Guy's Hospital. This artery has also been ruptured from dislocation.

Mr. Syme,¹ in a case of rupture of the axillary artery from a fall, tied the subclavian, and afterwards amputated at the shoulder-joint, the man did well.

Mr. Lizars² amputated the thigh of a man who was thrown from a coach; the popliteal artery was ruptured transversely, and blood was effused into the cellular coat. The patient recovered.

The aorta sometimes ruptures spontaneously, and occasionally this lesion occurs from violence. The subjoined table comprises the greater number of cases of this kind on record. Spontaneous ruptures, unattended with separation of the arterial tunics, happen generally at an earlier period of life than those which are called dissecting aneurisms. The rupture mostly takes place in a transverse direction, and is more frequently seated in the ascending aorta. In some patients death occurs instantly, in others the cellular coat forms a temporary obstacle to the escape of the blood. In some instances the coats have been diseased at the ruptured part, whilst in others they have been found apparently healthy.

¹ Edinburgh Medical and Surgical Journal, vol. 1.

² Ibid. vol. ix.

SPONTANEOUS RUPTURE.

Male. Above the valves, from fungiform disease of structure. History unknown.—(Chatham Museum, Prep. 26.)

Male. An inch above the valves; coats perfectly sound. (Mr. Shearly.—*Medical and Physical Journal*, vol. xviii.)

Æt. 37. Above the semilunar valves. (Mr. Smerdon.—*Ibid.* xlv.)

Male. Æt. 52. A rent two inches in length in the concave ascending portion; coat soft and covered with steatomatous deposit. (Mr. Rose.—*Ibid.* lviii.)

Male. An inch above the semilunar valves; the coats of the artery healthy. (Mr. James.)

Male. A small rupture close to the valves; ossification and ulceration of the coats; valves healthy. (Mr. Barcorne.—*Ibid.* lxi.)

Male. Æt. 43. Two inches above the valves.—(*Edinburgh and Glasgow Journal*, vol. iv.)

Male. Æt. 48. Abdominal aorta, two inches above the bifurcation. (Dr. Hume.—*Glasgow Journal*, vol. iv.)

Young woman, 7 months pregnant; occurred when in the act of stooping; lived 4 or 5 hours after the rupture; horizontal slit near the origin. (Dr. Elliotson.—*Lancet*, Oct., 1832.)

Female. A horizontal slit at the origin of the aorta; the rupture of the internal coats supposed to have occurred some time before death. (Dr. Elliotson.)

Female. Æt. 40. Sudden death; oblique slit near the heart; no ossific deposit or obstruction to the circulation in the aorta. (Mr. Ryan.—Feb., 1844.)

Male. Æt. 38. Sawyer. Ascending aorta ruptured into pericardium; opening the size of a split pea at the posterior part; arterial tunics thick, alternating with extreme tenuity. (Mr. Humpage.—*Medical Gazette*, vol. xii.)

Female. Æt. 36. Below the origin of the innominata; transverse rupture; coats much diseased. (Dr. Townsend.—*Dublin Journal*, vol. i.)

Female. Sudden death; great mental emotion; round aperture in the ascending aorta ossified inner coat. (Dr. Ferrus.—*Arch. Gén.*, vol. iii.)

Ulceration.—Male. Bone in the œsophagus, swallowed 8 or 10 days before.—(Archives Générales, 1825.)

RUPTURE FROM VIOLENCE.

Male. *Æt.* 45. Fell into a gravel-pit and was found dead. On examination two ruptures discovered, one near the semilunar valves, the other at the origin of the subclavian.—(Chatham Museum, Prep. 10.)

Male. Sudden death from a fall; a small rupture above the semilunar valves.—(Prep. 11.)

Male. Fell from a top-mast and had the spine bent backwards; transverse rent.—(College Museum, Prep. 1565.)

Male. *Æt.* 46. Fall on the back; all the coats ruptured.—(Prep. 1566.)

Male. Middle-aged. Fell from a height of 40 feet; ruptured at the commencement of the descending part; artery healthy. (Mr. Arnott.—Medical and Physical Journal, vol. lviii.)

Male. *Æt.* 40. Injury by a cart-wheel; aorta ruptured near the bifurcation. (Mr. Dalby.)

Male. Fall from a scaffold; rupture in the long axis.—(Lancet, 1827.)

TORN ARTERIES.

In addition to the ruptures last described, it not unfrequently happens that an artery is torn across by external violence; such as the forcible separation of a limb from the trunk by means of machinery, shot, cannon-balls, &c. In the majority of these cases but little, if any blood is lost at the time of the accident, and in some instances ligatures have not been required.

Cheselden¹ relates the case of a miller, whose arm was torn off by a rope. The arteries and veins were drawn out of the axilla. The surgeon who was first called placed them within the wound, which he dressed superficially. The man was then taken to St. Thomas's Hospital, where he perfectly recovered.

Mr. Scarnell² has published a similar example of the forcible separation of the entire arm from the trunk (no ligatures were employed). The patient's health suffered but little; he was

¹ Anatomy of the Human Body, 1778, eleventh edition.

² Lancet, April 1832.

able to walk at the end of a fortnight, and on the third Sunday he went to church.

A curious case of this kind occurred to M. Benomont.¹ A boy, about eleven years of age, had his leg torn off above the knee by the spokes of a coach-wheel; bleeding did not take place from the femoral artery, and no ligature was used. The bone was sawn off, the soft parts divided, and the boy perfectly recovered. A man² had both arms shot away at the elbow-joints by the same cannon-ball. No bleeding occurred during or after the accident. One arm was amputated, the other left. The man died twenty-two days after the injury from fever. Another case happened to Mr. Newbigging, in which the arm was torn off by the roller of a mill; amputation was performed a little below the joint. The extremity of the artery was swollen into a bulb.

Other accidents of a like description have been recorded by Larrey, La Motte, Carmichael, and Houston. The subjoined case, much abbreviated, which occurred to Dr. Houston³ is, I think, one of the most interesting and best described on record.

A man, 33 years of age, had his arm torn off (at a point corresponding with the insertion of the deltoid muscle) by the revolving strap of a corn-mill. There was no discharge of blood from the wound, except a little oozing from a few small vessels. A search was made for the brachial artery for the purpose of applying a ligature. When liberated from the torn sheath, to which its adhesion was so trifling as to admit of separation without the aid of a cutting instrument, the artery appeared dark coloured, smooth, and tumefied—the very extremity being the largest part. When pressed between the finger and thumb, it felt soft and elastic, as if tensely filled with half fluid, half coagulated blood, and was distended and jerked by pulsations synchronous with those of the heart; but, nevertheless, not a drop of blood either issued from, or could be squeezed out of its truncated extremity. In this state it was seen and felt by several persons, who regarded its condition of security against bleeding as very remarkable; a

¹ Mém. de l'Acad. de Chir. tom. ii.

² Hennen's Military Surgery, p. 171.

³ Dublin Journal, vol. xxiv.

ligature was then placed on the vessel about an inch above its torn extremity; cold lotion applied, and a little wine administered. Amputation at the shoulder-joint was next day performed, and the patient in due time recovered perfectly.

The extremity of the outer or cellular coat of the vessel was drawn, at the point of its laceration, over the mouth of the divided inner and middle coats (in the manner that a purse is closed by its string), and distended with a clot of blood, which was entangled and intimately united with the fine meshes of the torn cellular tissue on its inner surface. The two inner coats of the artery were (if it may be so expressed) drawn within the outer one for at least half an inch; the tube diminished in caliber and thrown into transverse wrinkles, but not lacerated at any part except that where it had been actually torn through, and the canal occupied by a coagulum. Outside the mouth of these tunics there lay a small piece of pure coagulated blood like that in their cavity; but the remainder of the projection in front consisted of the textures above described, viz., blood and cellular tissue, which afforded a complete barrier to further hemorrhage. This grumous material was even traceable for a short way up between the tunics, assisting by its pressure there from without to diminish the caliber of the vessel, and contributing also to that increase of its bulk observed in the first instance before the parts had been interfered with by dissection. Dr. Houston says, "The case may, I think, be regarded as proving what has hitherto been more a conjecture than a matter of certainty; at least, as regards the human body, namely, that the external tunic is capable of itself without a contraction of the whole artery, and without even a coagulation of the blood in its mouth (phenomena usually considered essential to the success of the process), of arresting on the instant, and both effectually and permanently, the escape of blood from an artery divided by laceration."

I saw the following case in July last, in King's College Hospital: D. R., æt. 28, admitted under the care of Mr. Fergusson, July 6th, 1846, at four p.m. He had, whilst at work, accidentally placed his hand on one of the cylinders of a bark-crushing machine, and the arm was gradually drawn in as far as the shoulder; from this position he was liberated by dividing the integuments and vessels—the humerus having

been crushed in various places. About three inches of the artery were seen hanging out of the wound, but not a drop of blood was lost. The cellular coat extended about three quarters of an inch beyond the middle and inner coats, and this, as in Dr. Houston's case, appeared to form the chief barrier to the passage of the blood. The artery was seen to pulsate violently to within an inch of its extremity. A quarter of an hour after his admission the arm was amputated at the shoulder-joint, and the man appeared to be doing well until July 15th, at half-past one p. m., when secondary hemorrhage occurred from the separation of the ligature: the artery was secured.

July 16th, five a.m. Bleeding took place a second time from the same cause, and another ligature was passed round the artery by means of a needle, so as to inclose a small portion of the parts in contact with the vessel. On the same day, at five p.m., the ligature was again forced off; the subclavian was tied by Mr. Simon. The man, however, had lost too much blood, and sunk immediately after the operation.

The extremity of the artery was quite open, and appeared as if divided by a knife; no coagulum had formed. The origins of the subscapular and long thoracic branches were seated about three quarters of an inch from the open end of the axillary artery; the parts around the extremity of the artery presented a dark sloughy appearance, and pus had collected in its cellular sheath; the axillary nerves entirely surrounded the artery and were firmly attached to it.

There are two interesting inquiries connected with these cases of torn arteries; the first, is the cause of the absence of hemorrhage, and various theories have been advanced upon the subject: retraction and contraction of the artery, effusion of blood under the cellular coat, and elongation of this tunic, have all in turn had their advocates. In speaking of the structure of arteries, I have said that there is a great difference between the physical elasticity of the cellular and internal tunics. If one of the iliac arteries be torn in the dead body, the cellular coat, in consequence of its want of elasticity, will be found to extend considerably beyond the other coats; and if the artery be injected with blood and then torn, a portion of the fluid will be seen in the cellular coat, and some diffi-

culty will be experienced in squeezing it out of the torn end. I believe that a very similar process takes place in the living body, and that the cellular coat, and not the sheath of the vessel, forms the chief obstacle to the passage of the blood. I therefore infer that the cellular coat is the principal means by which the bleeding is arrested in torn arteries, and that this is chiefly accomplished by the retraction of the internal and middle coats and the *elongation of the cellular*.

The second question of interest is the propriety of placing a ligature on a torn artery, where there is no disposition to hemorrhage. Whether, in fact, nature, if left entirely to her own resources, is more likely to accomplish the cure than the surgeon?

Mr. Guthrie¹ observes, "Arteries of moderate dimensions, such as the femoral or axillary, tibial or brachial, and particularly all below these in size, are capable by their own intrinsic powers, when completely divided, of arresting the passage of the blood through them without any assistance from art, or from the surrounding parts in which they are situated. This fact overthrows at once the whole theory which relates to the importance of and necessity for the sheath of the vessel, and the offices it performs in suppressing hemorrhage; and in a great measure, to that supposed to be derived from the formation of an external coagulum, the *bouchon* of the French." He adduces two instances which came under his own observation: the limbs were carried off by cannon-shot, and the arteries were seen pulsating to their extremities. Mr. Guthrie "cut off the end of the artery in both cases at less than an eighth of an inch from its extremity, when it bled with its usual vigour."

These are instances of torn arteries; but I presume that Mr. Guthrie would not expect the same result from an artery "divided" by a sharp-cutting instrument. I believe that the explanation I have before given will more readily account for the suppression of hemorrhage than that offered by Mr. Guthrie. The recorded cases are not sufficiently numerous for practical deduction. Cheselden, Scarnel, La Motte, and Benomont, used no ligatures, and the patients recovered without hemorrhage.

¹ On Wounds and Injuries of the Arteries of the Human Body, p. 10, (1846).

CHAPTER XXV.

WOUNDS OF ARTERIES.

IN commencing this part of my subject, I am desirous of stating that my own experience in the treatment of wounds of arteries has been but limited. In private practice these accidents are rarely met with, and even in our public hospitals the cases of this description are not sufficiently numerous to enable a surgeon to attach much importance to his individual experience. The battle-field and military hospital have afforded a wide scope for observation and inference, but unfortunately the greater number of the cases obtained from these sources have been but imperfectly recorded, owing to the hurry and excitement which necessarily occur during and after an engagement. To this circumstance, perhaps, may be attributed the difference of opinion which at present prevails respecting the treatment of some cases of wounded arteries.

Wounds of arteries may be inflicted in various ways, and by various instruments. The most common are from fire-arms, carpenters' tools, and sharp-cutting instruments, such as swords, bayonets, knives, &c. The artery may be completely divided, or a portion of its parietes only incised. The direction of the wound may be longitudinal, oblique, or transverse; and some authors have asserted that the first mode of incision is attended with less hemorrhage; I apprehend, however, that much will depend upon the size of the wound and other circumstances. Mr. Liston¹ mentions a case of wound of the anterior tibial artery in a longitudinal direction, in which "blood gushed out with great force, and in an immense volume."

It will not be necessary here to canvass the opinions of various authors respecting the process by which nature arrests the bleeding from a wounded artery. When the vessel is of moderate size and completely divided, its retraction is often sufficient to stop the hemorrhage. Bleeding from the larger

¹ Practical Surgery, p. 175.

arteries is arrested chiefly by inflammation and swelling of the parts around the wound, by the formation of an internal clot, and the extravasation of blood between the artery and its sheath; this is followed by the effusion of lymph, which quickly becomes organized, and the artery after some weeks is converted into a fibro-ligamentous cord. The works of Petit, Morand, Sharp, Gooch, Kirkland, Pouteau, Bell, Jones, Bécларd, Manec, Guthrie, Porta, and others, may be consulted for a more minute account of this process.

Wounds of the smaller arteries.—When the smaller arteries are divided either by accident or during surgical operations, the bleeding generally ceases spontaneously. In some cases it may be necessary to use the ligature, or perhaps torsion in arteries of this size may be preferable. Styptics of various kinds have been frequently employed, but they are not so much in vogue as formerly. Ruspini's styptic, solutions of alum, sulphates of zinc and copper, gallic acid, &c., have been frequently resorted to. The application of cold will be found serviceable in many cases; pressure both on the wounded artery and the main trunk will also exert a powerful influence in arresting hemorrhage from the smaller arteries; thus, in wounds of the palm of the hand, well-adjusted pressure on the brachial, or radial and ulnar arteries, will often stop the bleeding, and do away with the necessity for the ligature. In some cases of hemorrhage from deep cavities, the actual cautery has been used with advantage.

Leech-bites.—It has not unfrequently happened that very troublesome bleedings have occurred from this cause, and several infants have lost their lives from this form of hemorrhage. Numerous plans have been suggested for the purpose of arresting the bleeding: nitrate of silver, sponge, matico, glazed card, pinching the integument, the actual cautery, &c. These, in the majority of cases, will probably succeed; but where a large quantity of blood has been lost, and the child's life is in jeopardy, I would at once introduce a very fine needle through the lips of the wound, and then use the twisted suture, cutting off the ends of the needle. I have tried this plan (which I saw mentioned more than twenty years ago in some

medical journal) on two occasions, with instant success; indeed, it is impossible that bleeding can recur if the needle and suture are properly applied: it has this advantage over the actual cautery, that no scar is left.

Dental hemorrhage.—Dangerous and fatal hemorrhage may take place after the extraction of a tooth; it has sometimes been found necessary to use the actual cautery, and even this has not succeeded in arresting the flow of blood. Sir B. Brodie¹ tied the carotid in a case of this kind, but the patient died. If the application of nitrate of silver, or plugging the cavity with lint saturated with a strong solution of alum, or sulphate of copper, does not arrest the bleeding, I would advise the following plan which I have known successful in two cases (in one the hemorrhage had continued for thirty hours). After plugging the cavity with lint, a piece of cork is introduced which fits firmly between the two teeth, and projects a little beyond their crowns. A bandage is now tightly applied under the jaw, so that firm pressure is kept up (by means of the opposite tooth upon the cork) for several hours.

Dangerous bleedings from the nose not unfrequently take place; I have seen several cases where patients have been reduced to a very low condition from epistaxis, and I had an opportunity several years² since of examining the body of a woman, æt. 40, who died under the care of a medical friend from this hemorrhage. There was considerable hypertrophy of the left ventricle of the heart. On removing the right nasal and superior maxillary bones, the body of the sphenoid, and the orbital plates of the frontal, the mucous membrane of the nose and sinuses was examined with great care, but no vessel could be discovered from which the blood had escaped. The membrane over the inner portion of the turbinated bone was in a state of slight ecchymosis, and a small clot of blood was in contact with it.

If plugging the nostrils with lint, saturated with solutions of alum, sulphates of copper or zinc, with cold applications to the nose and forehead, do not succeed in arresting the hemorrhage, the following plan will most likely prove effectual. A

¹ Medico-Chirurgical Transactions, vol. viii.

² Lancet, 1839, p. 28.

piece of dentist's silk is passed, with the assistance of a bougie or eyed probe, through the nostril and brought out at the mouth; to this end a piece of sponge or sheep's intestine,¹ filled with water, is attached, and by pulling the thread, firm pressure is made by means of the sponge or intestine upon the back of the nostril, its introduction into the cavity being further facilitated by the finger of the operator. In partial divisions of the temporal artery the hemorrhage may be stopped by completely dividing the vessel. In wounds of the epigastric, pudic, lingual, and other arteries of this size, the treatment must vary according to the situation of the vessel. Torsion, if the end of the artery can be seen, may be tried. Long continued pressure with the finger has succeeded in arresting several dangerous hemorrhages from the internal pudic, or the artery of the bulb after the operation of lithotomy. In wounds of the lingual in infants, from division of the frænum linguæ, the actual cautery will generally be found effectual. I have known one instance of the division of this artery where the application of nitrate of silver stopped the bleeding.

Wounds of the larger arteries.—When the aorta or any of the larger arteries within the chest and abdomen are divided, death generally takes place very speedily; when, however, the wound in the artery is small, life may be prolonged for some days, and several cases are recorded of wounds of the aorta which were not instantly fatal. The effect produced by the wound of a large artery in the extremities, varies much in different cases, according to the nature of the wound, and the instrument with which it is inflicted. If the parts down to the vessel be extensively divided by a sharp-cutting instrument, the blood will readily escape in large quantities, and if not arrested by surgical treatment will generally soon destroy the patient. If the external wound be small and oblique, blood will be extravasated into the surrounding parts to a greater or less extent, and hemorrhage will occur at longer or shorter intervals. When the artery is injured by gun-shot, splinters of wood, &c. bleeding frequently does not happen until several

¹ This plan was, I recollect, recommended by Mr. Green in his Lectures on Surgery.

days after the accident, and then it arises from sloughing or ulceration of the arterial walls. A very common consequence of the latter kind of wounds, as well as of those inflicted by sharp-pointed instruments, is the production of a pulsating tumour which has been denominated traumatic aneurism. This form of aneurism is divided into three varieties. First the aneurismal varix, which consists (in consequence of both vessels being punctured) in a direct communication between the artery and vein; the latter is enlarged at the seat of puncture, and a peculiar whizzing noise is heard over the tumour. In the second species, which is called varicose aneurism, there is an intervening sac which forms a communication between the two vessels. In the third, and most frequent variety, the blood is extravasated into the parts around, in some cases producing a circumscribed swelling, in others a diffused enlargement, the blood often finding its way between the muscles and dissecting them from each other. The first two varieties seldom require surgical treatment. I saw a man in St. Thomas's Hospital a few years since, who had an aneurismal varix at the bend of the arm, as large as a walnut after venesection; it had existed for 22 years, and he had been able to follow his occupation (that of a gardener) without the slightest inconvenience.

In the last-mentioned variety of traumatic aneurism, occurring at the bend of the elbow, surgeons have differed much as to the best mode of treatment, some recommending the ligature of the brachial artery above the tumour, and others advising the cutting down upon the sac and securing the vessel above and below. Dr. Colles¹ of Dublin says, "I have operated repeatedly, and with success, for the cure of brachial aneurism, in consequence of injury to the artery in performing venesection. I have also frequently assisted others in operating for the same cause, and with the same result; and I never yet found it necessary to open the aneurismal sac or to look for the vessel below the tumour, or to apply more than one ligature around the artery, and which I think ought always to be tied as near as possible to the seat of the disease."

Mr. Liston² on the other hand, says, "Ligature of the brachial in the middle of the arm should be practised for aneurism at

¹ Guthrie on Wounds and Injuries of Arteries, 1846, p. 82.

² Principles of Surgery, 1846.

the bend of the arm, the consequence of careless venesection ; but if seen early tie both ends."

As I have before observed (page 183), it is questionable whether this operation should be resorted to until pressure has had a fair trial, and I am disposed to think that many cases of wounded arteries which are now thought to require the ligature, will be hereafter treated successfully by this method. When the bleeding from a wounded artery is not likely to be arrested spontaneously or by the means before mentioned, recourse must be had to the ligature.

I believe that nearly all modern surgeons are now agreed as to the propriety (when practicable) of enlarging the wound and passing a ligature round both ends of the artery, or above and below the bleeding aperture. The advice given by John Bell, in his admirable work '*On the Principles of Surgery*' (1801), when speaking of the treatment of wounded arteries, cannot be too strongly impressed upon the mind of the young surgeon, viz. "meet the danger boldly, and don't be afraid to look your enemy in the face." The subjoined extracts are from the same work. Bell says (p. 445), when commenting upon a case of gun-shot wound, "A well-instructed surgeon would have made a large and bold incision, laid open the wounded vessels that he might tie them ; would have picked away all the looser splinters of bone, but would have been careful, above all, in tying the arteries, knowing that if they continued to bleed outwardly the patient might die ; if inwardly, that they must inject the leg so strongly with blood that it might fall into gangrene, and would, at all events, run into a foul and gangrenous suppuration ; that the bones, also far from reuniting, would, in a few weeks, be thoroughly and irrecoverably diseased. . . .

"In all hemorrhages, where we have a full and rather dangerous bleeding, and in which we see distinctly one or two great arteries or veins throwing out blood, the bleeding must be suppressed either by ligature or by a steady compress, and the ligature, wherever we can use it easily, ought to be preferred. . . .

"If an artery of a smaller order, and lying firm against some bone, as in the hand, foot, or temple, be cut ; if either by a punctured wound a small aneurism be formed, as in the

wrist, or at the root of the thumb, or if, by a blow, the artery be hurt against the bone and bursts, so that a small beating aneurism ensues, we do not, in such case, always go regularly to work, we do not choose to give the patient the pain of opening such a tumour; but sometimes, by departing from the general principle, we manage the particular case more easily; we apply a compress, which being tied down hard and firm for two or three days, obliterates the artery by pressing it against the bone. The blood of such a trivial aneurism is as easily absorbed as that bloody tumour which we see so often on the heads of children immediately after birth, and which we are accustomed to disregard. The compress is like that with which we stop the temporal artery after opening it with the lancet. . . .

“The rule which arises out of this representation of the case is very plain, viz. not to be sparing in the first incision; to do this first and great point of the operation decidedly and boldly. The leaving no doubt about the tying of the artery, and no possible occasion for future incisions, is in the end the greatest saving of pain; the first operation is easier than the second, and the second operation is easier than the third. It is owing to this misplaced lenity of making small incisions at first, that any second operation is ever required. It is owing to a want of still greater boldness in the second operation, that a third is ever required; and we know too well how often a want of success in the third or fourth operation has tempted the surgeon to cut off the limb.”

Although Bell inculcated the necessity of cutting down upon a wounded artery, he did not distinctly advise the tying of both ends; it is to Mr. Guthrie that the profession is chiefly indebted for pointing out in a more especial manner the importance of this practice. The subjoined quotations are from his recent work on “Wounds and Injuries of Arteries” (1846). After some preliminary observations he says, “The treatment of wounded arteries is not better understood by students in general. They can all answer that a ligature ought to be placed above and below the wound in the artery, or on both of its ends when divided; but try them on the means to be adopted in a punctured wound of the axillary artery, or of the femoral, or in a case of wound of the calf of the leg, in which it is doubtful whether one or both of the arteries are injured,

and they are lost. If they fly for assistance to Mr. Hunter's theory for the cure of diseased arteries, they will find a method of proceeding which is never successful when put in practice for a wounded artery, or at least so seldom successful as to form only an exception to the general principle already mentioned, and which can never be departed from without imminent danger to the limb, if not to the life of the patient. It is not less extraordinary than true that different principles, as they are called, are taught in different schools of surgery in London, and my examinations on these points frequently become courses of instruction instead of inquiry; and I am, in consequence, obliged to exercise a leniency when about to pronounce sentence of approval or rejection, which often materially interferes with my sense of public duty. . . .

"The practice of the Peninsular war was decisive on many other points. It overturned the application of the theory of aneurism to the treatment of wounded arteries; and my paper, published in 1811, in the 'New Medical and Physical Journal,' demonstrated the necessity which existed for performing the operation at the wounded part of the vessel, and not at a distance. It showed, what is not yet well understood by many, that in no case (and this is without exception) should one ligature above the wound in an artery be depended upon, but that another should be applied, if possible, below it."

That "no operation should be performed on a wounded artery until it bleeds through the external wound," &c.

For a more detailed account of Mr. Guthrie's opinions, and for much practical information, I must refer the reader to the work itself. Mr. Guthrie has endeavoured to substantiate his opinions by 130 cases selected from the records of the practice of the most celebrated surgeons in Europe and America, with the critical remarks of the author on each.

At the risk of being charged with presumption, I shall attempt a brief analysis of some of these cases, and then leave the reader to judge whether the evidence adduced by Mr. Guthrie is sufficient to warrant his conclusions. I should have felt great reluctance in commenting upon Mr. Guthrie's remarks had he been less scrupulous in animadverting upon the treatment of others. The cases selected by Mr. Guthrie are necessarily so varied, both as to the nature of the injury

and the mode of its infliction, that it is difficult to form a useful classification; but from a careful examination of the cases, I cannot help expressing my belief that, in many instances, the deductions drawn from them are erroneous. Take, for example, wounds of the axillary artery and its branches. Mr. Guthrie says, "When it shall be shown that the operation of dividing the pectoral muscle, and of tying the axillary artery at, under, or above the pectoralis minor muscle, is more dangerous than tying the subclavian artery above the clavicle, I will yield my opinion that the subclavian artery should not be tied above the clavicle; but, in the meantime, I may be permitted, without any great presumption, to say that this operation will be found to be at least three times more deadly in its average result than the other."

But what is the result of Mr. Guthrie's own evidence? According to Dr. Norris (quoted by Mr. Guthrie), "Of 69 cases of ligature of the subclavian, 36 recovered and 33 died, 17 of these were for wounds of the axillary artery; 9 of the operations were successful, and 7 terminated fatally."

Mr. Guthrie quotes twenty-three cases of wounds of the axillary artery and its branches: (55, 56, 59, 61, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 79, 80, 81, 84, 85, 86.) In eleven of these the subclavian was tied above the clavicle; in eleven the artery was ligatured below; and in one case only (59) was the operation recommended by Mr. Guthrie performed: the patient died of disease of the chest. Of the eleven cases of ligature of the artery above the clavicle, only two patients died—one death occurred from hospital gangrene, after amputation at the shoulder-joint, and one from the bursting of an internal aneurism. Of the eleven patients in whom the ligature was applied below the clavicle, six recovered, three died from mortification of the extremity, one from exhaustion, and one from hemorrhage.

Notwithstanding the extraordinary success which appears to have resulted from the above-mentioned treatment, Mr. Guthrie considers it in every instance (to say the least) to have been injudicious.

Take again the carotid and its branches where the communication between the opposite arteries is very extensive.

Mr. Guthrie mentions nine cases (119 to 128) of ligature of this artery for hemorrhage the result of wounds or ulcers ; but he does not make any deduction from them : he says, " In all cases of hemorrhage from the throat, which cannot be suppressed without tying the carotid artery, it is generally the external carotid which ought to be tied, and not the trunk of the common carotid. There is not sufficient reason for cutting off the supply of blood to the head by the internal carotid, unless the operation on the external should fail when the common carotid may be tied as a last resource."

I am at a loss to understand why the ligature of the external carotid should be preferred to that of the primitive trunk, more especially as the latter operation is less difficult than the former, and the ligature of the common carotid, in the great majority of cases, of bleeding from wounds and ulcers has prevented the recurrence of dangerous hemorrhage.

The common carotid has been tied for wounds of the neck by Abernethy, Carpue, Guthrie, Larrey, Bidor, Giroux, Dacrux, Boileau, Sisco, Roux, Michon, Tyerman, Marjolin, Dupuytren, Hebeinstreit, Sedillot, Ellis, Brown, Horner, Hemming, Collier, Travers, Vincent, Twitchell, Maling, Ellis, U.S., and Clarke.

Of these 27 operations, 19 were successful and 8 terminated fatally (Abernethy's, Guthrie's, Giroux's, Marjolin's, Travers', Maling's, Sedillot's, and Vincent's). The cause of death in two appeared to be exhaustion from the shock of the accident and the loss of blood previous to the application of the ligature ; one died from irritative fever, one from hemiplegia, one from softening of the brain, one from suppuration and hemorrhage, occurring at the seat of ligature, one from fever after hemorrhage, and in one (Mr. Maling's case) the cause of death is not stated. Of the successful cases, dangerous hemorrhage scarcely occurred in one instance ; in three or four, bleeding to a small extent took place from the original wound. In Dr. Ellis's patient (U. S.) it was necessary to tie the carotid on each side, but it is probable that both lingual arteries were wounded. In several cases the operator endeavoured to enlarge the wound and secure the bleeding vessels, but in only one example was it practicable, and this is the only case on record

(that I know of) in which both ends of the artery have been tied. It is thus described by Mr. Guthrie:¹ "A soldier of the rifle brigade at Ypres was wounded by a penknife in the throat, and bled profusely. Staff-surgeon Maling tied the common carotid above and below the wound, and succeeded in arresting the hemorrhage, although the patient did not eventually recover. The practice in such cases is clear, and ought to be decided."

The common carotid has been tied for ulcers of the fauces by Messrs. Luke, Mayo, and Syme, and these operations were all successful. Mr. Syme's patient, however, lost a large quantity of blood after the operation.

In the cases of false aneurisms before described, p. 283, both patients died. Mr. Liston's from secondary hemorrhage, and Mr. Macmurdo's from small bleedings after the operation, the patient having previously to the application of the ligature lost three or four quarts of blood.

The subjoined is a comparison between the results of the ligature of the carotid artery for spontaneous aneurism, for wounds and ulcerations, and for erectile tumours.

	Cases.	Deaths.
For spontaneous aneurism ² . . .	21 . . .	11
For erectile tumours . . .	16 . . .	3
For wounds and ulcerations . . .	33 . . .	9

I have lately seen the following interesting case of wound of the neck in St. Thomas's Hospital, which shows the difficulty, nay, almost the impossibility, of securing the vessel at the wounded part. A. W., æt. 29, of intemperate habits and delicate constitution, was admitted into St. Thomas's Hospital, Oct. 14th, 1846, under the care of Mr. Solly. About a quarter of an hour before his admission his wife had thrown a knife at him, which entered the neck below the angle of the jaw on the right side, making a straight incision about two inches in length; a large gush of blood took place. Fortunately he lived next door to a medical man, and immediately ran into the surgery, where the assistant applied a compress, called a

¹ Before cited, p. 79.

² These are mentioned in the Table of Aneurisms, and in five cases the ligature was applied on the distal side of the tumour.

coach, and took him directly to the hospital. Mr. Solly tried to secure the ends of the bleeding vessels, but did not succeed; and whilst he arrested the bleeding by pressure, Mr. Clark tied the common carotid artery, and the bleeding instantly ceased. A compress of sponge was placed on the upper wound. It was supposed that the lingual and thyroid branches were divided.

15th. Going on well, has had no bad symptoms, complains only of slight difficulty of swallowing, and says that his throat feels sore.

16th. The plaster removed, the sponge, which was at first introduced, was taken away yesterday; the throat is inflamed, and he appears to labour under slight bronchial inflammation, but the granulations are healthy.

29th. Has not had an untoward symptom, the ligature came away this morning, and no indications of brainular disturbance have been present.

He gradually recovered and left the Hospital on the 31st of November.

The same difficulty occurred to Mr. Collier (Guthrie's cases, 120) in a case of wound of the neck with a spear. Mr. Collier says, "I attempted dilatation, but all efforts to trace the source of bleeding were fruitless." In another instance of cut throat (Case 123) Mr. Guthrie first tied a slit in the vein by passing the tenaculum through its edges; the carotid artery had a transverse cut upon it which did not appear to penetrate through the middle coat. Hemorrhage occurred on the 8th day from this part of the carotid which had been cut, and Mr. Guthrie adds, "I placed a ligature upon the common carotid immediately below this opening, but the flow of blood was scarcely diminished in quantity by it, in consequence of the reflux from the head. On attempting to apply another ligature above the opening, I found, as I had before suspected from the situation of the wound, that it was immediately below the division of the common carotid into the external and internal carotid arteries. The hemorrhage ceased on placing a ligature on the external carotid above the wound in the artery, and, as the patient was greatly exhausted, I refrained from tying the other. The bleeding did not return, but he died the next morning (9th day) from weakness. On examination after death the internal jugular vein was found pervious, and without a mark

indicating where the ligature had been applied. The origin of the internal carotid was filled for about a quarter of an inch with a soft coagulum of blood."

In wounds of the larger arteries of the upper and lower extremities, the ligature of both ends of the vessel has been attended with a more favorable result, but the cases of recovery are so numerous where one ligature has been applied above the wound, that I think Mr. Guthrie is not justified in saying "that the patients recovered in spite of bad treatment, and that the Hunterian theory of the cure of aneurism is totally and utterly inapplicable to the treatment of wounded arteries accompanied by an open wound."

Sir J. Ballingall¹ mentions four cases of wounds of the radial artery near its origin, in which the brachial was tied with success; and I might adduce numerous examples on record of a like kind where the ligature of the main trunk on the proximal side of the wound has succeeded in arresting the hemorrhage. It is questionable whether the rule laid down by Mr. Guthrie, "not to tie a wounded artery until it bleeds," is generally applicable to wounds of the neck. I believe that many lives have been lost in consequence of the neglect of the early application of the ligature to the carotid, and I think that Mr. Guthrie's own case (123) is a good example. It must be borne in mind that the ligature of this artery, as far as the operation is concerned, is not attended with much risk, and that there is probably more danger to be apprehended from the recurrence of bleeding from the wound. The following is a good illustration of this :² "May 25th. — was admitted into St. Bartholomew's Hospital about five days ago. He was a man servant, and, in a state of high excitement, had seized a penknife and inflicted a wound just above the os hyoides. Upon admission we did not see the case, but there was, we understand, a good deal of hemorrhage which appeared to be chiefly venous; this, however, was shortly put a stop to without any vessels being secured, as it was not known that any artery of consequence had been divided. The state of the man's mind soon became tranquil, he lay calmly in bed, and seemed likely to go on very well. Yesterday morning hemorrhage suddenly came on, which

¹ Mr. Guthrie, before cited, p. 80.

² *Lancet*, vol. ii, 1832, p. 255.

the sister arrested by cold applications. About eleven o'clock last night, *having returned by himself from the water-closet* and got into bed, the attention of the nurse was suddenly called to him by a brief ejaculation. She found him with red blood streaming from his nose and mouth, and although Mr. M'Whinnie, the house surgeon, arrived in a minute or two, he found the patient lifeless, having lost about three quarts of blood. This unexpected termination of the case excited much interest in the *autopsy* which was instituted to-day, and the most rational way of accounting for death appeared to be the supposition that some vessel unknown to be wounded had been plugged up by a clot of coagulum, which was disturbed by the exertion of going to the water-closet. Dissecting out the vessels around the wound, it was found that the *lingual* artery of the left side had been divided, and the extremity lay exposed in the gash which had been made. The other blood-vessels remained entire. It is proper to state that the man had no instrument within his reach with which he could have effected a second cut."

The following are the conclusions I have come to respecting the treatment of wounded arteries.

First, that well-adjusted pressure upon the artery above the wound, will in many instances arrest the bleeding and lead to a permanent cure without the use of the ligature.

Secondly. That pressure should, in all cases of traumatic aneurism at the bend of the arm, be tried before the ligature is resorted to.

Thirdly. That in cases where the hemorrhage is likely to endanger life (pressure being inapplicable) it is desirable to tie *both ends of the artery* where they can be readily secured.

Fourthly. That although it is advisable to pursue the last-mentioned plan of treatment when practicable, the successful cases of ligature of the main artery on the proximal side of the wound are sufficiently numerous to warrant the belief that this operation will, in the majority of cases, arrest the hemorrhage and lead to a favorable result.

Fifthly. That in many instances it is difficult, if not impossible, to find the bleeding artery, especially when the surrounding parts are inflamed and infiltrated with blood.

Sixthly. That many operators have failed in securing both ends of the artery or even one of them ; and that in some instances where the mouth of the bleeding vessel could not be seen, the hemorrhage was arrested by passing a curved needle round the artery, and including some of the neighbouring parts in the ligature.

Seventhly. That a more careful and extensive record of facts must be obtained before anything like positive conclusions can be arrived at respecting the treatment of some cases of wounded arteries ; that no general rule can be applicable to all ; and that the surgeon must be guided principally by the circumstances of the case.

DISEASES OF VEINS.

CHAPTER I.

PHLEBITIS.

INFLAMMATION of veins was first noticed in this country by John Hunter in 1793, in the 'Transactions of a Society for the Improvement of Medical and Surgical Knowledge.' Of late years the disease has been more fully investigated in England by Hodgson, Travers, Brodie, Carmichael, Davis, Lee, Arnot, Douglas, and others; on the Continent by Meckel, Frank, Bichât, Velpeau, Balling, Cruveilhier, Blandin, Dance, Raciborski, Rokitansky, and Hasse.

The two principal varieties of the disease are, those cases attended with the formation of pus in the veins, and those in which the vein is plugged by adhesive fibrinous coagula, without the presence of suppurative action. In the former class of cases the blood appears to be infected, and there is great constitutional disturbance; in the latter variety the disease is more circumscribed, and the general system remains uncontaminated. Most causes of a debilitating nature predispose to this affection; thus it generally occurs in those whose constitutional powers are impaired by mental anxiety, intemperance, and excesses of various kinds. The parturient condition also predisposes to both varieties of the affection, and certain states of atmosphere appear to favour the production of the disease. When traumatic, the exciting cause is mostly a wound in the vein from bleeding; it may also arise from injuries of different descriptions and surgical operations. Mr. Guthrie¹ says, "I have seen it destroy, I had said nearly hundreds, being in

¹ Medical and Physical Journal, vol. lvi.

fact the most common cause of death after amputation." "Cruveilhier¹ believes that it occasions the greatest number of deaths after the operations in Paris." In some cases of erysipelas, as well as in Bright's disease, the veins have been found inflamed. Phlebitis may also be occasioned by the pressure of tumours upon the larger veins; obliterations of the cava and other large trunks have occurred from this cause.

Bleeding with a foul lancet, and the use of the arm too soon after the operation, are very frequent causes. I am induced to think that resinous plaster which is often applied to the orifice after bleeding, by its becoming puckered, proves an additional source of irritation, and that it not unfrequently occasions the inflammation. I believe that it does not happen so often when a well-adjusted compress of lint has been applied over the orifice in the vein. Some persons believe that this inflammation occurs more frequently in patients who are bled for thoracic inflammation. My experience will not enable me to give an opinion upon this point, but it must be borne in mind that bleeding from the arm is most frequently resorted to in inflammations of the chest.

Symptoms.—The symptoms attending the suppurative form of venous inflammation are of a formidable character, and in some cases very rapid in their progress. The wound (if from bleeding) presents a red gaping appearance, there is tenderness along the course of the veins, and in many instances the skin looks inflamed. The patient is affected with rigors, quick pulse, anxious countenance, dry, brown tongue, headache, delirium, and great depression of the constitutional powers. In addition to the extreme tenderness, in some instances the veins are hard and swollen. Collections of matter form in the lungs, pleura, liver, joints, and other parts, and death in a short time puts an end to the patient's sufferings. In other examples the symptoms are less formidable, and the cases have a favorable termination.

Sir B. Brodie and others have described the symptoms attending venous inflammation as analogous to those met with in typhus fever. Mr. Guthrie, on the other hand, thinks

¹ Dict. de Méd. et Chir, tom. xii.

that the symptoms are not analogous to those of typhus. I believe that the symptoms vary in different cases; thus, in some instances the tongue is brown, and low muttering delirium is present; in others the tongue is clean, and the intellect unaffected. The chief characteristics of the suppurative form of phlebitis are, rigors and great depression of the vital powers, the anxious and dirty yellowish hue of the countenance, rapid pulse, and quick breathing. In some cases these symptoms appear very soon after the formation of pus, and quickly destroy the patient, whilst in other examples they progress with less rapidity.

Morbid appearances.—These vary according to the amount of inflammation, and the duration of the disease; in the early stage the inner lining of the vein presents a reddened, inflamed aspect; this is succeeded by coagulation of the blood, fibrinous clots, and deposits of lymph (preparations 12 and 13). Purulent and sero-purulent deposits are often found in the lungs, liver, kidneys, spleen, cavities of the joints, and other parts. Sometimes this fluid is mixed with the blood, or it may be shut up in the veins by the effusion of coagulable lymph; in other cases abscesses form in the cellular tissue in the neighbourhood of the veins.

In some examples the inflammation extends to the heart. Mr. Travers has related a case of this kind from ligature of the femoral vein. The coagula in phlebitis are generally larger, and less fibrinous than in arterial inflammation; this probably results from the more yielding character of the venous coats. M. Blandin has seen the veins filled with pus at a distance from the wounded part, particularly after injuries of bone. In addition to the foregoing, effusions of serum into the ventricles of the brain and pericardium are not unfrequent. Sometimes collections of pus in the neighbourhood of the veins will occasion phlebitis; Case 78, in the Table of the Morbid Conditions of Arteries, is, I think, an instance of this kind. A girl, æt. 26, had diffused abscess in the axilla; symptoms of great depression took place, and she rapidly sunk. The axilla and parts around were infiltrated with a thin, imperfectly-formed pus. The inner lining of the brachial and axillary veins was of a bright red, and the subclavian contained two

large patches of recently-formed lymph. No pus appeared to be present in the veins; the lungs were congested, but there was nothing remarkable about any other part.

I shall not attempt to give an opinion respecting the unsettled points connected with the pathology of this disease; but I shall content myself by simply stating the questions which appear to be still undecided; viz. 1st. Is the pus secreted by the lining membrane of the vein, or is it formed by the conversion of the blood-globules into pus?

2dly. Are the abscesses so frequently met with in the lungs, liver, and other parts, produced by the arrest of the pus-globules in the capillary circulation, or are they sequelæ of inflammatory action at the seat of the purulent deposit?

Treatment.—This disease generally occurs in a class of patients who will not bear general depletion. Leeches (the number varying according to the constitution of the individual) should be applied along the course of the veins; these may be followed by hot fomentations and poultices. In some cases it is necessary to support the strength by the administration of stimulants, especially in persons who have lived freely, or who have been addicted to spirit drinking. If abscesses form along the course of the veins, it is desirable that early openings should be made for the evacuation of the pus. Mr. Bond, in the ‘Madras Medical Reports,’ 1831, has published two successful cases of phlebitis following venesection, in which the veins were laid open to the extent of three or four inches, and one or two drachms of pus evacuated. A fatal case, treated in the same manner, is also recorded. This plan has been adopted by veterinary surgeons in phlebitis occurring in the horse after bleeding, and I believe that no bad effects have followed. It is questionable whether this mode of treatment is not worthy of more frequent adoption. Mr. Chapman, in the 56th volume of the ‘American Journal of Medical Science,’ says, “if a narrow strip of blistering plaster is placed along the course of the veins, and the blistered part kept open, this treatment will arrest the disease in a large majority of cases.” He also enjoins the necessity of keeping the limb in a proper position in a well-adjusted case. Sir B. Brodie recommends mercury so as slightly to affect the gums, except in those cases

where the vital powers are much depressed. Opium, quinine, ammonia, and tartarized antimony, are valuable medicines in some stages of the complaint. The disease, however, in spite of our efforts to arrest it, often runs on to a fatal termination.

That variety of the affection which occurs in the parturient condition is generally the most fatal, and the least amenable to medical treatment. M. Tonellé states that in 233 cases of puerperal fever, inflammation of the veins and lymphatics of the uterus was present in 110, and several of the French and German practitioners have found pus in these veins.

In the following case which I saw some time since, the uterine veins were free from disease. A poor woman, about twenty hours after her confinement with the tenth child, had intense pain in the hip-joint, this was shortly followed by the same kind of pain in the os coccygis; the pains lasted for several hours, and were only subdued by hot fomentations and opiates. The breathing became hurried, pulse rapid, countenance anxious, belly tumid, but not tender on pressure, and she died of puerperal fever two days and a half after delivery. I examined the body, which, although dead only thirty-six hours, presented a putrid appearance (weather rather cold). *Chest.*—Lungs gorged with blood, especially the depending parts; heart normal, but flabby. On carefully examining the abdominal viscera, I could discover no abnormal condition in them; the peritoneal surface throughout was free from inflammation; the right ovary was slightly congested, but not more so than I have seen before in women who have died a few days after delivery. The uterus was about the size of two small fists, it was quite empty, and the lining membrane smooth and free from open-mouthed vessels; its substance was flabby and doughy, but no trace of inflammation or its consequences could be discovered in the veins. The iliac veins were also free from inflammation. I did not examine the hip-joint or the sacro-coccygeal articulation, a circumstance I afterwards regretted, as I think it not improbable (considering the intense pain in these parts) that I should have found sero-purulent deposit.

CHAPTER II.

PHLEGMASIA DOLENS.

UNTIL of late years, this disease was supposed to be peculiar to the parturient condition. Numerous cases, however, of its occurrence in males, and unmarried females, have been recorded in the Medical Journals during the last twenty years; and as an example of the former, I may mention the oft quoted case of the Earl of Liverpool.

When occurring after delivery, the disease comes on generally about the second or third week; not unfrequently at a later period.

Levret mentions one case as late as a year after the birth of the child. It is generally preceded by some constitutional disturbance, viz., rigors, followed by heat of skin, restlessness, quick pulse, and the other symptoms of febrile excitement. When the disease commences in the upper part of the thigh, the patient complains often of a sense of constriction in the pelvic region, this is accompanied by tenderness and slight shooting pains in the groin which gradually extend down the limb. There is usually great tenderness on pressure along the course of the femoral vessels, and sometimes after a few days, the vein can be felt hard and cylindrical. In some cases, the skin has a mottled hue; in other and less frequent examples, the disease appears to commence in the foot or calf of the leg, and gradually extends upwards. The symptoms progress with more or less rapidity in different cases; the limb is much swollen, white, tense, elastic, and the integument has a peculiar brawny feel. The disease sometimes assumes a chronic form, the limb remaining hard, stiff, and swollen, for a considerable time.

Dr. Davis¹ was the first to point out the inflammatory state of the iliac and femoral veins in this affection.

Bouillaud (in the Archives Générales de Médecine, 1823),

¹ Medico-Chirurgical Transactions, vol. xii, 1823.

published several cases, showing that the disease consisted in the obstruction of the femoral veins by fibrinous coagula. Mr. Guthrie, in the 56th volume of the Medical and Physical Journal, 1826, says, "I would suggest for the future, the propriety of tracing the veins from the common iliac of the affected side down to the uterus; and when attention is particularly directed to this point, I have little doubt that the inflammation of the veins will be found to have begun at the uterus, and to have ascended along a continuous surface until it implicated the veins of the extremity, the inflammation being in a degree adhesive, and the uterus not quite in a healthy state. In the generality of cases in which an examination takes place after death, the traces of inflammation may be readily overlooked in this part of the veins leading from it, unless they are made objects of especial observation."

In the 15th volume of the Medico-Chirurgical Transactions, Dr. Robert Lee has published his views respecting the pathology of this disease. "He believes, that in phlegmasia dolens the inflammation commences in the uterine branches of the hypogastric veins, and subsequently extends from them, into the iliac and femoral trunks of the affected side." Dr. Lee supposes that the uterine veins are left open after parturition, and a communication thus established between the venous system and the atmospheric air, in a manner somewhat analogous to that which takes place in amputation, and other extensive wounds. "Such a condition of the uterine veins," he observes, "must be favorable to the production of inflammation, and inflammation once excited, is seldom limited to their orifices, but extends with greater or less rapidity along the continuous membrane of the uterine veins to the spermatic or hypogastric, and from thence to its principal branches."

Although I am disposed to pay much regard to the opinion of so able an investigator of pathology as Dr. Robert Lee, I am inclined to think that his views respecting this affection are very far from correct. This disease seldom occurs till after the tenth day, and often it makes its appearance as late as the fifth or sixth week. In some cases, one extremity is first attacked, and after an interval of a few weeks the other becomes affected. If the admission of air into the uterine veins were the cause of the inflammation, its effects would be seen at an

earlier period, when the mouths of the veins would be open, which I apprehend can scarcely be the case after the third or fourth week, or even as early as the tenth¹ day, the uterus being at that period so considerably reduced in size. Moreover, the symptoms produced by the admission of air into veins, do not at all resemble those of inflammation, and I am not aware that, in any of the cases of death from this accident, fibrinous coagula have been found. Dr. Lee believes "that there is an analogy between these cases and those occurring after amputations and other extensive wounds." It appears to me that there is no resemblance between the examples quoted. The effect of the introduction of air into veins is always immediate, and we have no evidence to show that inflammation is ever produced by this cause. I think, that Dr. Lee is also mistaken in supposing that the disease invariably commences in the uterine veins. I have had a patient under my care during the last six months, who, twelve days after delivery, had the disease in the right leg; it gradually extended upwards, until the iliac vein could be felt hard and tense. There was great tenderness along the course of the vessel, with a sense of constriction in the lower part of the abdomen. After these symptoms were greatly relieved by leeches and hot fomentations, the left leg became affected, but the inflammation did not extend to the groin, the iliac vessels being free from tenderness. The urine was albuminous.

The following is an example of the same kind; but one extremity only was affected:

Mrs. B., eleven weeks after her confinement (on getting out of bed) felt sudden pain in the sole of her foot; this gradually increased up the leg, which became swollen, and assumed the appearance of phlegmasia dolens. After a week the swelling extended to the thigh, and there was much pain and tenderness in the groin. Twenty-eight leeches were applied to the leg, with hot fomentations, and purgatives and antimonials were administered. The leg and thigh remained swollen for a long period, and three years elapsed before she recovered the

¹ I have notes of the examination of five uteri in women who died soon after delivery, but the large open-mouthed vessels spoken of by some writers were not present in one instance.

perfect use of the limb. She suckled her child, and the secretion of milk was never deficient. I could refer to numerous cases of a like nature recorded in the Medical Journals, and occurring in the practice of my friends.

A variety of causes, unconnected with the parturient condition, have been enumerated as leading to inflammation of the veins of the lower extremities and the subsequent production of phlegmasia dolens. The application of cold, suppressed catamenia, diseases and injuries of the bladder, rectum, and uterus, ulceration of the foot and leg, and operations of various kinds. In many cases, however, the disease appears without any evident cause. Some writers believe that this disease depends upon inflammation of the lymphatics, an opinion which, I think, cannot be supported by pathological evidence. I have myself suffered three times from absorbent inflammation of the arm, from dissection wounds, and have seen many other cases of this kind; but in no instance have the symptoms resembled those of phlegmasia dolens.

Treatment.—The local treatment of this disease, when occurring after parturition, will differ little from that of traumatic phlebitis. It should consist in the application of leeches along the course of the affected veins, bran poultices, and hot fomentations, the foot being slightly elevated. A spare farinaceous diet, with aperients, antimonials, and opiates, according to the urgency of the symptoms, will include the principal therapeutic measures. When the disease becomes chronic, I have seen great benefit result from frictions with soap liniment, followed by a bandage. In one case I made several punctures with a curved needle, but only a very small quantity of thick albuminous fluid oozed from the apertures.

Obliteration and Obstruction of Veins.—One of the most frequent consequences of subacute phlebitis is the obstruction of the vein from fibrinous coagula; in some cases, as in phlegmasia dolens, these coagula are removed, and the vein may again perform its proper function. It more frequently happens, however, that permanent obliteration is produced; and when this occurs in the cavæ, it will necessarily give rise to very formidable symptoms. Several cases of obstruction of the cavæ are on record, and when the pathology of the veins

is better attended to, these occlusions will probably be more frequently met with. These obstructions (especially when occurring in the superior cava) are generally occasioned by the pressure of aneurismal or other tumours upon the vein. Sometimes the occlusion appears to be produced by acute or chronic inflammation of the venous tunics coming on without any evident cause. In some instances the fibrinous deposit is found adherent to the sides of the vein, and appears to have existed for a considerable time; in others the coagulum is less adherent, and of a softer consistence. Haller, Winckler, Morgagni, Reynaud, Baillie, Cline, Twissen, Bérard, Peacock, and Carson, have recorded examples of the obliteration of the inferior cava; Otto, Deckart, Reynaud, Knox, Hardwicke, Elliotson, Dance, Reid, Bouchut, and Velpeau, have met with instances of obstruction in the superior trunk.

The usual effects of these obstructions are enlargement of the superficial and deep-seated veins of the chest and abdomen, œdema of the upper and lower extremities, effusion into the pleural and peritoneal cavities, dyspnœa, and orthopnœa. In some examples (even in obstruction of the superior cava) the symptoms have been less urgent than the importance of the lesion would lead us to expect; and in a few instances there is reason to believe that these occlusions must have existed for several years.

The cavæ are sometimes obliterated by malignant growths; I have recently seen an obstruction of the inferior cava at Guy's Hospital, taken from a patient of Dr. Barlow's. The man was 44 years of age, and for several weeks he laboured under great enlargement of the superficial veins of the trunk, ascites, anasarca of the scrotum and lower extremities, vomiting, scanty urine, and on one occasion hæmaturia; a few days before death, hæmatemesis and melæna. Dr. Barlow has recorded a somewhat similar example in the Guy's Hospital Reports, 1844.

When the blood in the larger veins of the extremities is arrested in its course, by the deposit of fibrinous coagula, the usual effect is enlargement of the limb from serous infiltration, and this swelling will generally be a tolerably accurate guide as to whether the obstruction is venous or arterial. In arterial obstruction (as I have before remarked when speaking of

arteritis) the limb, from a deficient supply of blood, shrivels and wastes, and dry gangrene is the result. On the other hand, when there is occlusion of a large venous trunk, the same amount of blood passes into the main artery, but its return to the heart through its usual channel is arrested, and hence the enlargement before spoken of. Occasionally small round fibrous bands are seen running across the veins of the lower extremities; these are most likely the remains of the valves: Preparation 79 in the Museum of St. Bartholomew's Hospital is a beautiful specimen of this kind.

In chronic diseases and in certain cachectic conditions of the system, the blood sometimes coagulates spontaneously in the large veins. An interesting paper on this subject is published in the 'Gazette Médicale,' 1845, by Dr. Bouchut.¹ These coagulations have generally been found in the pelvic veins, and in the deep-seated veins of the lower extremities; but are rarely met with in the veins of the upper extremities.

"Of 51² cases of spontaneous coagulation of the blood (not puerperal) met with by Dr. Bouchut, he found 44 examples of venous obliteration from the pelvic to the tibial veins; one example of obliteration of the superior cava, one of obliteration of the veins of the neck, of the arms, and inferior extremities at the same time; another of the sinuses of the dura mater, two in which the obstruction was seated in the pulmonary artery, and two where it existed in the portal veins." The origin of these coagulations of the blood in the veins is involved in much obscurity. I am not disposed to think with Dr. Bouchut that *spontaneous* coagulation of the blood is of frequent occurrence. I believe that it generally depends upon a subinflammatory condition of the inner tunic of the vein. It is probable that it may be occasioned in some instances by a diseased condition of the blood itself. Thus, in Case 57 in the Table of the Morbid Conditions of Arteries, the spleen and liver were considerably enlarged. The blood in the upper part of the inferior cava was firmly coagulated, and presented a mottled, nutmeg appearance. Coagulations of blood in the veins have been found in some cases of slow death in cachectic persons where the vis a tergo for some time before dissolution

¹ Translated by Dr. Birkett, Medical Gazette, June 1845.

² Gazette Méd., p. 249. April 1845.

was insufficient to assist in propelling the blood through the venous trunks. These coagulations have not the hard, fibrinous appearance of those produced by inflammation.

Treatment.—If the obstruction is seated in the cavæ, I fear that little can be done for the patient. The abstraction of small quantities of blood from the arm, at short intervals, so as to diminish the venous congestion will, I think, be most likely to afford relief. If the obstruction is in the veins of the extremities, the same treatment as recommended in phlegmasia dolens may be pursued.

Ossification and Deposits in the Veins.—Notwithstanding the frequency of the various deposits in the arteries, the veins appear to be almost exempt from these changes; and some authors have believed that vessels carrying black blood are always free from bony and atheromatous lesions. I have met with the following specimens.

In the Museum of the College of Surgeons, the femoral vein of the late Lord Liverpool. (Prep. 1732-3.) In the Middlesex Hospital Museum is a preparation of ossified veins, taken from a male subject, brought into the Little Windmill Street School, which had lost the right leg below the knee; the operation having apparently been performed some years before, as there was a great hardness of the cuticle covering the lower part of the knee. Mr. Tuson, on examining the deep-seated veins (the common and external iliac), found part of these veins covered with thick ossific deposit. In St. George's Hospital Museum (Prep. 2 F., A. 5) is a specimen of an ossified vein. In the University College Museum there is an ossification of the femoral vein. (Prep. 590.) Chatham Museum, Prep. 409, shows cartilaginous and bony concretions in the pudic veins.

The inquiry naturally arises, why are these deposits so frequent in the arteries, but rarely met with in the veins? Some authors, and I think with little reason, have thought the presence of unoxygenated blood sufficient to account for

the circumstance. I believe the explanation will be found rather in the structural formation of the veins. If we refer to the structure of veins, it will be seen that the subserous membrane, the common seat of adventitious deposits in the arteries, is absent in these vessels, the fibrous coat is also thinner than in the arteries, and consequently more yielding and distensible; the venous tunics are, moreover, less subject to the force of the heart's action; so that the various causes producing sudden distension of arteries have but little effect upon the veins. In the specimens of ossified veins which I have examined, the bony matter was deposited in thick *irregular layers*, which appeared to commence in the middle coat.

Phlebolithes or Veinstones.—These are small, bony, or cretaceous deposits, situated generally in the depending veins, especially of the pelvis; they have been found in other parts, but are seldom seen in the larger veins. Cloquet mentions two cases where they were present in the inferior cava. They are of a rounded, ovoid form, and vary in size from that of a pin's head to a pea, and are composed (according to Gmelin) of phosphate of lime, with a portion of carbonate of lime and magnesia. It is difficult to determine whether these formations are seated under the serous membrane or upon its inner surface; in all the recent specimens which I have seen, a delicate, transparent membrane has covered the concretions, and I am inclined to think that they are formed under the inner coat of the vein. Sometimes several of them are seen together, and in some specimens they are equidistant, having a knotted, beaded appearance. They are more frequently found in subjects over forty years of age, and I believe they are never present in the arteries. Several of them, in various stages of development, may be seen in the College Museum.

CHAPTER III.

DILATATION OF VEINS.

ENLARGEMENTS of the caliber of the venous trunks seldom take place before the age of twenty, but as age advances they become more prevalent. My friend Dr. Jemmet, who is resident surgeon to the Parkhurst prison (for juvenile offenders), in the Isle of Wight, has supplied me with the following information: "Since the prison has been opened there have been received into it 1260 boys, varying from 7 to 10 years of age. By reference to the Medical Register I find the following: three cases of piles—one in a boy of 14; trade before admission, a gunmaker—trade in prison, a tailor. The second case, in a boy, *æt.* 13; trade before admission, a candlemaker—trade in prison, a tailor. The third case, in a boy of 14; no trade before admission—trade here, a shoemaker; in all three the occupations were of a sedentary character. One case only of varicocele, in a lad of 13, who, before admission, was a gentleman's servant, and while here, a tailor. One case of varicose veins in the left popliteal space, in a lad of 15, who was a labourer before admission, and while here, a bricklayer. The veins were of an enormous size; he accidentally discovered them while washing his legs; he had, however, suffered slight pain for some months before, although not of sufficient intensity to cause him to direct his attention to the part. I know not of a case of phlebitis. Out of the 1260 prisoners, I hear there have been only five cases of disease affecting the venous system."

The veins of old people are more yielding and distensible, and contain a larger quantity of blood than in early life. A varicose condition of the veins, however, is not so common after the age of 60. The increased force of the heart's action, and the diminution of elasticity in the arterial tunics will probably be sufficient to account for this. The superficial veins of the chest and abdomen, as well as the azygos and other deep-seated veins, are generally much dilated

in total or partial obstructions of the aorta and vena cava. Sometimes enlargements have occurred in the internal jugular vein. Allan Burns says, "it is by no means a rare occurrence to meet with an enlargement of this vein near the angle of the jaw, especially in asthmatic subjects."

Varicose Veins.—The veins may become varicose in any part of the body; but the most common seat of these dilatations is in the hemorrhoidal, spermatic, and the subcutaneous veins of the lower extremities, where the blood, from various kinds of pressure upon the cava, iliac, and femoral trunks, is arrested in its course towards the heart. The effect of these obstructions is the weakening of the coats of the vessel, and probably, in some cases, the rupturing of the valves. The latter lesion has not been often ascertained by inspections after death, few, if any, of which are recorded. Preternatural dilatations of the superficial veins of the lower extremities are probably often occasioned by the partial loss of the function of the valves from over-distension. Washerwomen and others accustomed to long standing are particularly liable to these affections. External injuries and great muscular efforts may also tend to the production of the disease. It has in many instances been occasioned by the pressure of the gravid uterus upon the iliac and abdominal veins; and it is always aggravated during the latter stages of gestation. The veins soon after delivery decrease in size, and frequently produce but little, if any, inconvenience, until the next pregnancy. The deep-seated veins of the trunk and extremities are seldom varicose; the support they receive from the surrounding parts is the most probable cause of their exemption. In varices of the saphæna veins and their branches, the vessels are large, tortuous, and elongated; sometimes the caliber of the tube is equally dilated, whilst in other cases, lateral bulgings occur, which somewhat resemble the aneurismal dilatations of arteries. The vein is occasionally obstructed by fibrinous coagula, but in the majority of instances it is pervious; a thick, hardened appearance is frequently produced by the deposit of lymph in the surrounding cellular tissue. The skin and cellular membranes near the varices are often in a state of chronic inflammation, and ulcers form which are extremely difficult to heal.

Treatment.—When the veins of the lower limbs are varicose rest in the recumbent position and local pressure by soap-plaster, compress, bandage and laced stockings, are the safest means. If inflammation is present, the application of leeches and evaporating lotions will be serviceable. Attention to the state of the chylopoietic viscera is also important ; as congestion of the abdominal veins, from disease or functional disturbance of the liver, will aggravate and perhaps occasion the malady. Numerous plans of treatment have been recommended for the radical cure of varicose veins. Amongst these I may mention—pressure, acupuncture, ligature, incision, excision ; the application of potassa fusa ; Vienna paste ; strangulation by means of a needle and twisted suture ; and the division of the vessel by passing a knife underneath the skin, as recommended by Sir B. Brodie. So many fatal cases are recorded after these operations (particularly from the use of the ligature), and probably a much greater number have never been made public, that I question whether the above methods of obliterating varicose veins of the extremities should ever be resorted to ; more especially as the majority of patients are but little if at all benefited by the operations. If the flow of blood is stopped in one vein, the caliber of others is increased in consequence ; and although the varices diminish in size soon after the operation, I believe that in many cases they are ultimately larger than before. I know some surgeons who have practised these operations to a great extent without a fatal result, and they believe with advantage to their patients ; the reported cures, however, have failed to convince me that the ligature or excision of the saphæna vein or its branches is under any circumstances justifiable. I can form no correct estimate as to the comparative number of fatal cases ; but admitting the mortality to be only one per cent., an estimate I think far below the average, it should surely deter the surgeon from the performance of an operation which seldom promises permanent benefit to the patient. Sir A. Cooper mentions 12 fatal cases after ligature of veins, and says that he would rather have his femoral artery tied than the saphæna major vein.

Mr. Carmichael¹ tied the saphæna vein in a stout young

¹ Transactions of King's and Queen's College of Physicians, Ireland, vol. ii, p. 345.

man, for an ulcer attended with a varicose state of the veins of the leg, according to the method recommended by Sir E. Home. A few days after the operation the man became uneasy and restless, pulse quick, breathing oppressed, with tenderness and swelling of the thigh. These symptoms were followed in a few days by strong rigors, frequent sighing, and a sense of weight about the præcordia. The disease, in eight or ten days from its commencement, assumed very much the character of typhus fever, abscesses formed in different parts of the body, and the patient died.

Sir E. Home met with two fatal cases after ligature. Hodgson mentions two deaths from the same cause, and Sir B. Brodie one.

Hemorrhoids.—One of the most frequent situations of varices is in the hemorrhoidal veins, either above or below the sphincter, constituting what are called internal or external piles. As in the lower extremities the veins may be generally dilated, they may form bulgings and protuberances containing fluid or coagulated blood, the coats may be inflamed and thickened, and hard painful swellings occur from the formation of fibrinous clots, and small abscesses may take place in the neighbourhood of the vessels which may lead to fistula. Sometimes there is considerable induration from effusion of lymph in the cellular tissue, and warty, condylomatous excrescences are formed around the anus. Although hemorrhoidal affections are so common, but few well-recorded cases of dissections of these tumours are to be met with, and this will in some measure account for the difference of opinion that prevails respecting the nature of the complaint. Thus, some pathologists have contended that the veins are but little if at all implicated, and that effusions of blood or serum are the most frequent causes of the disease. Although numerous and careful dissections must be made before this question can be satisfactorily decided, I think we have already abundant evidence to prove that venous dilatation exists in the great majority of cases.

Causes.—It is probable that hereditary predisposition is a frequent cause of this complaint, and it is not unusual to find

it prevail among the members of the same family. I am acquainted with a family, all the members of which for four generations have been subject to piles; the individuals spoken of have generally been long lived and healthy. A sluggish state of the liver, obstructions in the portal circulation, in short, any cause which prevents the return of the blood to the inferior cava, is likely to produce a dilated and varicose condition of the hemorrhoidal veins. Another very frequent occasion of piles is a confined state of the bowels; the feculent matter by its pressure upon the venous trunks preventing the return of blood and in this manner producing dilatation. Drastic purgatives and powerful aperients will induce the complaint; certain occupations, especially those of a sedentary kind, may be mentioned as likely to predispose to the disease. Luxurious habits tend much to the production of hemorrhoids. In Turkey, where the habits of the people are sedentary and their mode of living luxurious, the disease is very prevalent. It prevails also to a much greater extent in this country among the higher and middle ranks. The puerperal state is another frequent cause of hemorrhoids, in consequence of the pressure of the gravid uterus upon the abdominal veins.

Treatment.—In the treatment of hemorrhoidal affections it is important to ascertain, if possible, the cause of the disease. If it is supposed to arise from a constipated state of bowels, mild aperients, such as the sulphur præcipitatum, confect. sennæ, cream of tartar, rhubarb, and castor-oil may be had recourse to, to remove the obstruction. It is necessary, however, to bear in mind that aperient medicines should only be used when absolutely necessary; the habit which too frequently prevails of taking daily purgatives, is one, I believe, to be productive of much mischief; and, independently of its injurious effect upon the digestive organs, it is likely to aggravate rather than cure the disease in question. The patient should endeavour to obtain relief from the bowels at least once daily; a habit that may readily be acquired by a little perseverance. In some cases, if the bowels are torpid, coarse bran-bread may be eaten; green vegetables, and fruits of various kinds, if the stomach will bear them, are also serviceable. Sometimes a fig, with a tablespoonful of olive-oil, will act as a gentle laxative, and do away with the necessity of having recourse to

more powerful aperients. If the liver is torpid, and the skin does not perform its proper functions, the administration of mild mercurials, combined with the use of the flesh-brush or sponging the body with tepid water, the skin being afterwards well rubbed with a rough towel, may prove beneficial; it is also very important that the patient at the same time should observe a mild, unstimulating diet. In the puerperal condition, but little good can be expected from internal medicines, more than preventing a confined state of the bowels: rest in the horizontal position should likewise be enjoined. In addition to the internal remedies before mentioned for the treatment of this disease, the balsam of copaiba, cubeb, confection of black pepper, black pitch, &c. have been recommended by various authors. Nearly all who have written on hemorrhoidal affections have condemned the use of aloetic medicines as likely to produce irritation and congestion of the rectum. Large doses of aloes would generally have this effect; but I believe that when the drug is administered in small quantities it will, in many cases, prove very serviceable. One grain of socotrine aloes, two of ginger, and three of rhubarb, made into a pill, and taken at bedtime for a week or ten days, will often relieve the complaint. The *confectio piperis nigri*, in drachm doses twice or thrice daily, has in some cases been found efficacious. The pitch I have tried in several instances; in some with much apparent benefit, in others with no good effect. The balsam of copaiba, where there is much mucous irritation, is likely to be useful. The injection of cold water into the rectum every morning has been recommended by Sir B. Brodie in some cases.

A variety of external applications have been recommended for the cure of piles; and probably one of the best preventives of the complaint is the daily ablution of the anus with cold water. The external applications may be divided into those which are of a soothing and antiphlogistic character, and the astringent remedies; the former should be used when inflammation and irritation are present, and will chiefly consist of the application of leeches, fomentations with hot water, decoction of poppy heads (to which laudanum may be added if the pain be severe), bran poultices, &c. The astringent remedies should only be had recourse to in the absence of in-

flammation. The diacetate of lead lotion, alum wash (ʒij to a pint of water), decoction of oak-bark or nut-galls, the ungt. gallæ either alone or combined with opium, are the best of the astringent applications. A strong solution of nitrate of silver will often afford great relief after a few hours, although when first applied the heat and irritation are much increased. In some instances, where much hemorrhage occurs from internal piles, it may be necessary to have recourse to the ligature, a proceeding always preferable to excision when the varices are above the sphincter; but even this operation is not unattended with danger, as several fatal cases have occurred after it, and it should always be practised with great caution. Dangerous and fatal hemorrhages have followed the excision of internal piles. Sir A. Cooper lost four patients after the excision of internal piles. Sir B. Brodie mentions two fatal cases. Sir A. Cooper¹ says, "A young man may have been in the habit of removing piles by excision; he may do this twenty times with success, and consequently believe that the operation is perfectly safe. At length he meets with disappointments, similar to those of which I have enumerated four instances; he will then retrace his steps, and consider whether he has been pursuing a right system—whether, upon the whole, some other plan may not be preferable, and his experience will teach him that the ligature is decidedly the safer operation."

Other measures besides those above mentioned have been resorted to for the removal of piles. The actual cautery, continued pressure, the introduction of pins for a few hours through the vein, &c. The use of the actual cautery has, I believe, been long abandoned, in consequence of its painful and injurious effects, and I have had no experience as to the efficacy of the latter modes of treatment.

Sometimes combined with piles a very troublesome and obstinate itching affects the anal orifice. I have found a solution of the bichloride of mercury the best application. The following is the lotion I am accustomed to use in the absence of inflammation:—R Hyd. Bichloridi gr. ij, Tinct. Opii ʒj, Aquæ ʒij, ft. Lotio bis vel ter die utenda.

¹ Lectures, p. 409.

The spermatic veins are not unfrequently varicose, a condition which in many cases occasions but little inconvenience. Sometimes, however, this state of the veins gives rise to very unpleasant symptoms, such as pain in the back, wasting of the testicle, severe pain, sense of weight, &c. This affection, like varicose veins in other parts of the body, arises from a certain amount of obstruction to the free current of the blood; thus the left spermatic veins are generally the seat of the dilatation. Breschet operated upon 120 patients, and in only one instance was the disease on the right side. The termination of the left spermatic vein in the renal, the absence of valves, the obstruction to the return of the blood from distensions of the colon, have been assigned as the most likely circumstances to account for the greater prevalence of the disease on this side.

Diagnosis.—Sometimes this enlargement has been mistaken for hernia; it is mostly of a pyramidal shape, and generally disappears in the horizontal position. Sir A. Cooper¹ says, when speaking of the diagnosis of hernia, “Varicocele is, more frequently than any other disorder, mistaken for an omental hernia. When large it dilates upon coughing; and it swells in the erect, and retires in the recumbent posture of the body. There is only one sure method of distinguishing the two complaints; place the patient in a horizontal posture, and empty the swelling by pressure upon the scrotum, then put the fingers firmly upon the upper part of the abdominal ring, and desire the patient to rise; if it is a hernia, the tumour cannot reappear so long as the pressure is continued at the ring; but if it is a varicocele, the swelling returns with increased size on account of the return of blood into the abdomen being prevented by pressure.”

Treatment.—In the majority of cases the use of the suspensory bandage is all that will be required; if pain and inflammation be present, the application of leeches, cold lotions, and rest in the recumbent posture, should be enjoined. Numerous plans for the radical cure of varicocele have been tried, but I am inclined to think that the great majority of the patients operated upon have received no ultimate benefit. In

¹ Lectures.

this affection, as well as in that of varicose veins of the legs, many of the operations have been reported as successful soon after their performance, but it is probable that if the operators had waited a few years they would have arrived at very different conclusions as to the result. Excision of a portion of the scrotum, an operation first recommended by Sir A. Cooper,¹ and since modified by Dr. Watson² of New York, appears in many cases to have been practised with advantage. Pressure by means of forceps so as to produce occlusion of the venous canal, the ligature, excision of a portion of the vein, the needle, and twisted suture, metallic wire, seton, and potassa fusa, have also been recommended. In some instances the pain and inconvenience have been so great that it has been found necessary to remove the testicle. The scrotal veins are sometimes varicose: a suspensory bandage, and, if pain and inflammation be present, leeches and cold lotions will be the most likely means to afford relief.

Ulceration of Veins.—The veins are occasionally subject to ulceration; several cases have occurred after scarlatina, from abscess and ulceration of the neck and fauces. Mr. Bloxam (in the 26th volume of the Medico-Chirurgical Transactions) has published two instances of death from this cause, and two others have recently come to my knowledge, both of them occurring in children after scarlatina. In one case an attempt was made to tie the common carotid, it being thought at the time that the bleeding was arterial; in the other case, the child sunk from loss of blood without operation. Malignant ulceration and injuries of various kinds have also led to the destruction of the venous coats. When bleeding occurs from this cause, the chief indications of treatment are the application of the compress and bandage, the pressure being made upon the wound, as well as upon the distal side of the vein; the use of cold and styptics may likewise be resorted to, and in some cases perhaps the diacetate of lead may be administered internally with advantage.

¹ Guy's Hospital Reports, vol. iii.

² The American Journal of the Medical Sciences, 1845.

Rupture of Veins.—The superficial veins sometimes rupture spontaneously, especially when they are in a varicose state, and a few instances of death from this cause are on record; the patients, however, have generally been treated by ignorant persons. A fatal result, I apprehend, can scarcely happen when the patient meets with timely surgical aid. Amussat¹ mentions one instance where death took place from rupture of the saphæna vein. A fatal case of hemorrhage from the rupture of a vein in the leg occurred at Yarmouth, in 1838. A woman, who had a varicose ulcer of the leg, went into a chemist's shop for some ointment; she left the shop, but soon returned, having lost a large quantity of blood from the bursting of a vein; the bleeding continued, she was insensible when a surgeon arrived, and died after a few minutes. Another death from the same cause happened in Marylebone last year; it is mentioned in the Registrar-General's report, but I have not been fortunate enough to learn the particulars.

Rupture of the internal veins may also occur spontaneously or from violence; thus the passage of a heavy vehicle over the body and contusions of various kinds, have produced rupture of the venous trunks, and in some instances led to fatal hemorrhage. A case of rupture of the ascending cava is reported by Mr. Piper.² It occurred from the passage of the wheels of a gun-carriage over the chest. The vein was ruptured longitudinally near the auricle. Dr. Flogel³ relates the case of a "soldier, who, on parade, fell suddenly from his horse and died instantly; four pounds of dark loosely coagulated blood were found in the posterior mediastinum which had escaped from a rent in the vena azygos. The vein was enlarged throughout."

Wounds of Veins.—The veins, like the arteries, are subject to partial and total division from accidents of various kinds; and dangerous and fatal hemorrhage will sometimes take place from this cause, and it is occasionally necessary to have recourse to the ligature. It must be recollected, however, that the veins are more prone to diffused inflammation than the

¹ Archiv. Gén. de Méd., vol. xiv, p. 608.

² Lancet, 1844, p. 127.

³ British and Foreign Review, 1846.

arteries, and on this account the use of the ligature should be avoided if possible. I have seen the femoral vein tied several times after amputation of the thigh, and in one instance, fatal phlebitis followed the operation. The blood from a wounded vein is dark-coloured, and it escapes in a continuous stream, but it is important to remember that in some cases of arterial hemorrhage, where the bleeding is from the lower end of the vessel, that the blood will present nearly the same appearance as venous blood, and not flow *per saltum*.

In some cases the ligature of the main artery will speedily arrest the hemorrhage from the vein. Mr. B. Cooper tells me that in four or five instances where he has had reason to believe that the femoral vein has been injured during the operation for popliteal aneurism, the ligature of the artery at once had the effect of suppressing the hemorrhage. Velpeau¹ says, when speaking of venous hemorrhage during surgical operations, "After removing all obstacles that can interfere with the circulation of the blood in the limb, the patient should be told to make several long and deep inspirations, when the bleeding will generally stop immediately."

¹ Méd. Opératoire, tom. ii, p. 379.

CHAPTER IV.

THE ADMISSION OF AIR INTO VEINS.

ALTHOUGH this accident can scarcely be considered to come under the head of Diseases of Veins, yet it is one of so much importance that I think it will not be out of place to notice it. It has only excited the attention of surgeons in this country during the last fifteen or twenty years, and up to a late period many have even doubted the possibility of its occurrence. The vast number of well authenticated cases of death from the admission of air into the veins during surgical operations, must now, however, convince the most sceptical.

These cases appear to have occurred more frequently on the continent, indeed, I know of no examples in the records of English surgery until the last few years. It is not, however, improbable that some of the cases of sudden death during operations, which have been attributed to syncope, may have arisen from this cause. "Mr. B. Cooper,¹ in the 27th volume of the '*Medico-Chirurgical Transactions*,' has related an interesting example of this accident. After removing a girl's arm at the shoulder-joint, he detached a large gland in the axilla; this was followed by a gurgling noise, the patient immediately fell into a state of threatened dissolution, the fæces and urine were passed involuntarily, and an hour elapsed before she could be removed from the table. She gradually recovered."

I believe that no well authenticated fatal case has occurred to a British surgeon. I have witnessed numerous operations about the neck and shoulder, but I never saw any ill effects arise from this cause; in Mr. Key's case (page 206) five veins were divided near the clavicle without injurious consequences. Velpeau² says, "I have seen M. Roux open (by mistake) the subclavian, axillary, and internal jugular veins, without the usual symptoms resulting from the introduction of air." He

¹ Mr. Cooper tells me that "he heard the gurgling noise when the air entered the vein, and that the nature of the accident at once occurred to him."

² *Nouveaux Elémens de Médecine Opératoire*, tom. i, p. 47.

also states "that he has extirpated tumours about the maxillary, cervical, and axillary regions more than fifty times, and that it has been necessary to cut near to the large veins in these regions, and sometimes to open them, but this accident occurred in only two instances."

Buchane (1818) was the first to notice this accident, but, until a case occurred in the practice of Dupuytren at the Hôtel-Dieu, it excited but little attention. M. Velpeau¹ states "that he has collected about 40 cases: five of these are of a doubtful nature; sixteen of the patients recovered and thirteen died. Only seven were examined after death."

Cause of death.—In the examination of the lower animals killed by the introduction of air into the veins, the right ventricle of the heart, and pulmonary artery have been found much distended with frothy blood. Air has seldom been found on the left side of the heart.

In the examination of fatal cases occurring in the human subject after surgical operations, the appearances have been less satisfactory. In some the right ventricle has contained air-bubbles, in others these have been absent. Death has generally been attributed to the great distension of the right ventricle from expanded air. The presence of air in the pulmonary artery and in the vessels of the brain, has also by some been assigned as the cause of death. "Dr. Copland believes the fatal effects to arise from the oxygen of the atmosphere combining with the carbonic oxide of the venous blood, and thus forming carbonic acid." The first of these opinions appears to me to be the most probable.

M. Bossy, in the 16th volume 'Recueil de Médecine Vétérinaire,' has related two cases of death from the admission of air into the jugular veins of a horse during bleeding, and the occurrence of formidable symptoms from the same cause in a third. Professor Spooner, of the Veterinary College, informs me that the effects produced by the introduction of air into the veins of horses are various. For example, in some cases immediate death is the consequence, whilst in many instances the animal will live some time after a considerable quantity of air has been forced into the vein.

¹ Before cited, p. 41.

DESCRIPTION OF PLATES.

PLATE I.

Arterial tree; the figures indicate the order of frequency of the different situations of aneurism.

PLATE II.

- Fig. 1. The four arterial tunics, A the serous coat, B the subserous, c the fibrous, D the cellular.
2. The common iliac artery, showing the direction of the fibres of the fibrous coat, at its bifurcation.
 3. The circular fibres of the fibrous coat as observed in the branches from the arch of the aorta.
 4. The pulmonary artery, showing the semicircular direction of the fibres of the fibrous coat above the valves.
 5. A portion of the ascending aorta, A the serous coat removed, and the subserous elevated by slips of pasteboard.
 6. The vasa vasorum of the brachial artery ramifying upon the fibrous coat, and injected with vermilion, as seen under the microscope. The vessels injected by Mr. Rainy.

PLATE III.

- Fig. 1. The arch of the aorta of a negro (Case 26, p. 13) affected with jaundice. The vasa vasorum highly injected with blood.
2. A piece of the thoracic aorta, showing the effects of imbibition.
 3. A portion of the descending aorta from a man 31 years of age who died of compound fracture of the leg. Pleuropneumonia and effusion of pus into the larger joints. (Case 48, p. 15.)
 4. A portion of the descending thoracic aorta of a boy 8 years of age, with white cretaceous spots along the origins of the intercostals. (Case 50, p. 15.)

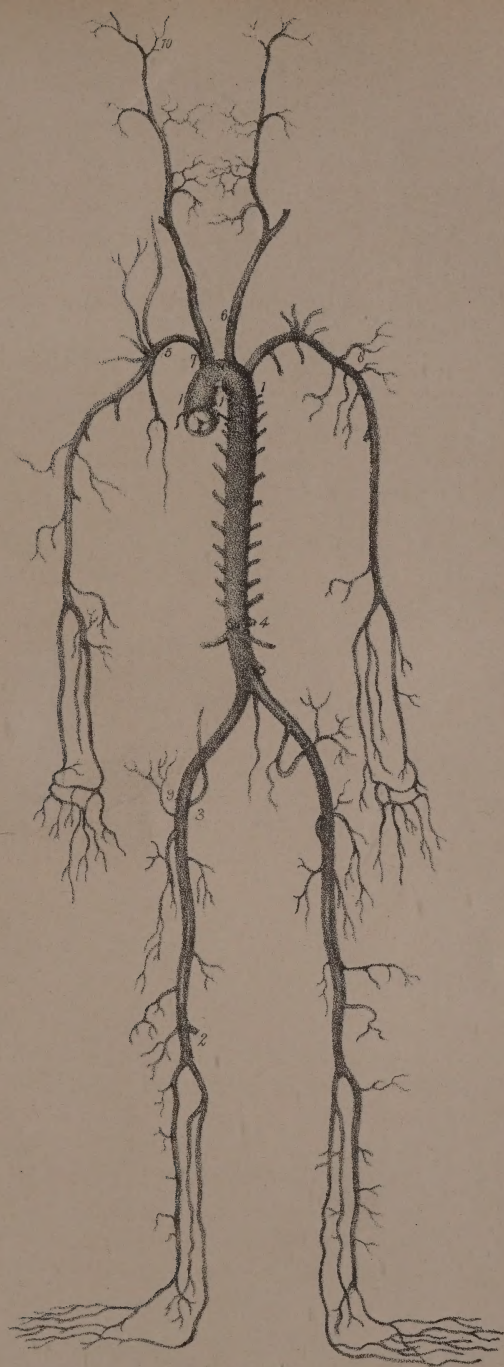
PLATE IV.

- Fig. 1. A piece of the thoracic aorta acutely inflamed, with flakes of lymph upon its surface.
2. Acute inflammation of the iliac artery, with deposit of lymph.
 3. A, Atheromatous deposit on the subserous coat; this coat detached leaving the fibrous tunic B in a normal state.
 4. The cerebral arteries, affected with cartilaginous and atheromatous deposits.
 - 5 and 6. Aneurisms of the cerebral arteries (pages 165, 166).
 7. Rupture of one of the aortic valves producing sudden death; a fibrinous coagulum is attached to the ruptured surface (Case 8, page 88).
 8. Ossific deposit in a dried femoral artery.
 9. A solid, concave, bony plate, A, at the arch of the aorta, probably arresting the progress of dilatation of the arterial tunics.
 10. Ossification of the aortic valves, seen from the interior of the artery (Case 7, page 87).
 11. Obstruction of the brachial artery from rupture, and inflammation of the inner coats (Case 2, page 46).

PLATE V.

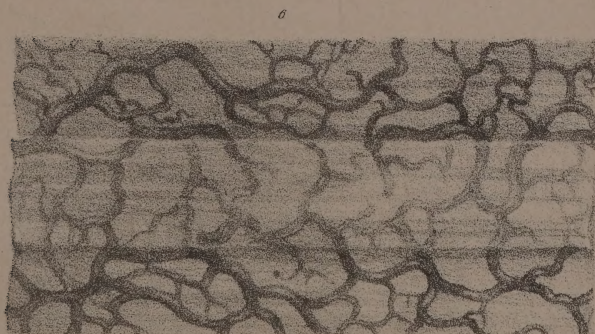
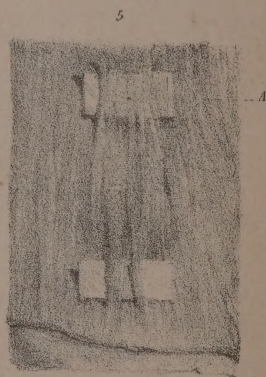
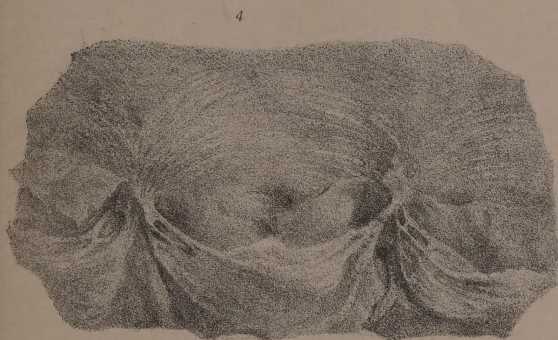
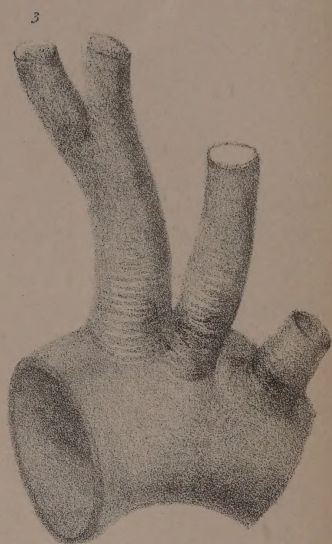
An injected preparation in the Museum of St. Thomas's Hospital, showing spontaneous obliteration of the right common iliac artery and the method by which the circulation was carried on. The vessels are injected from the aorta. The right common, and external iliac arteries are converted into a ligamentous cord. The superior hemorrhoidal, last lumbar, and the middle sacral are the principal vessels enlarged; anastomosing with the circumflex ilii, obturator, and circumflex arteries.

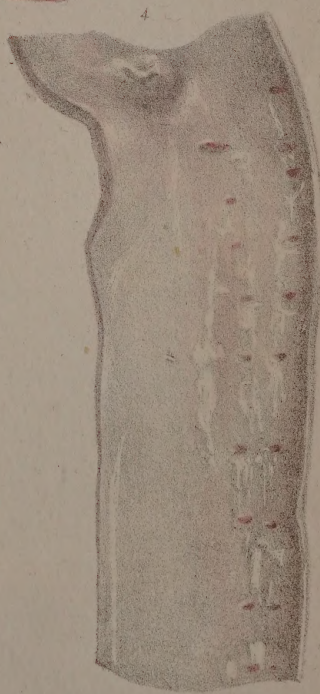
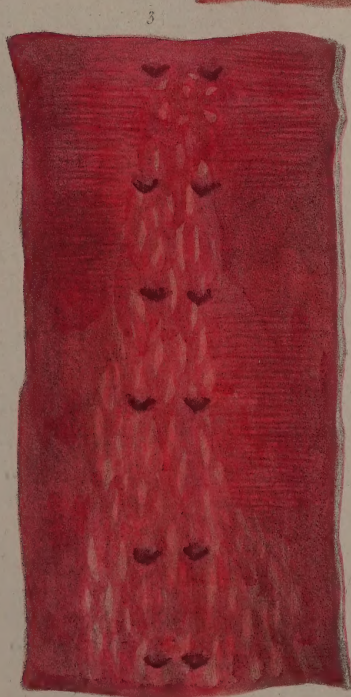
The history of the case is unknown; the subject was a male about 35 years of age, taken into the Webb-street dissecting-room. No cicatrix was visible externally, and it is probable that the obliteration occurred in early life.

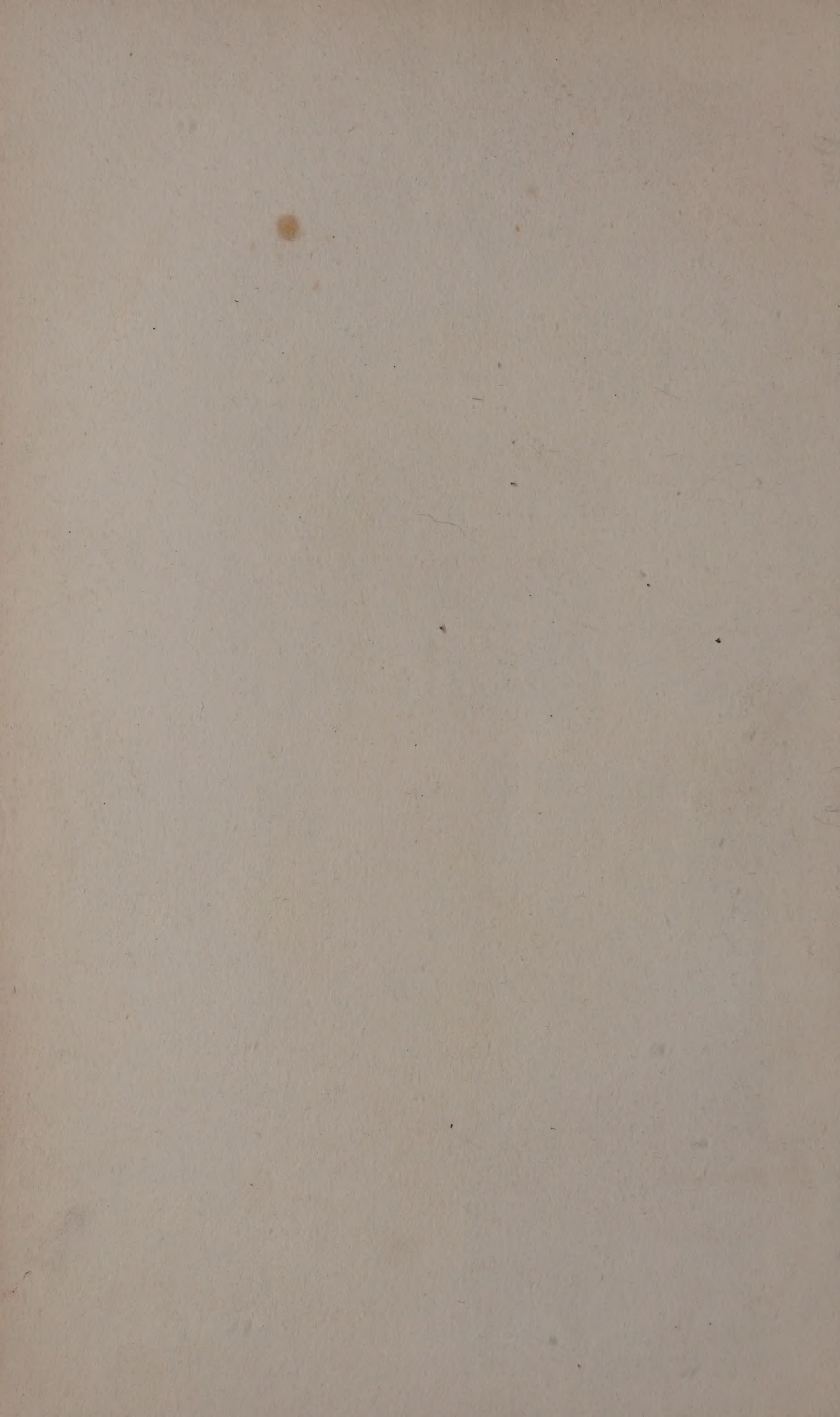


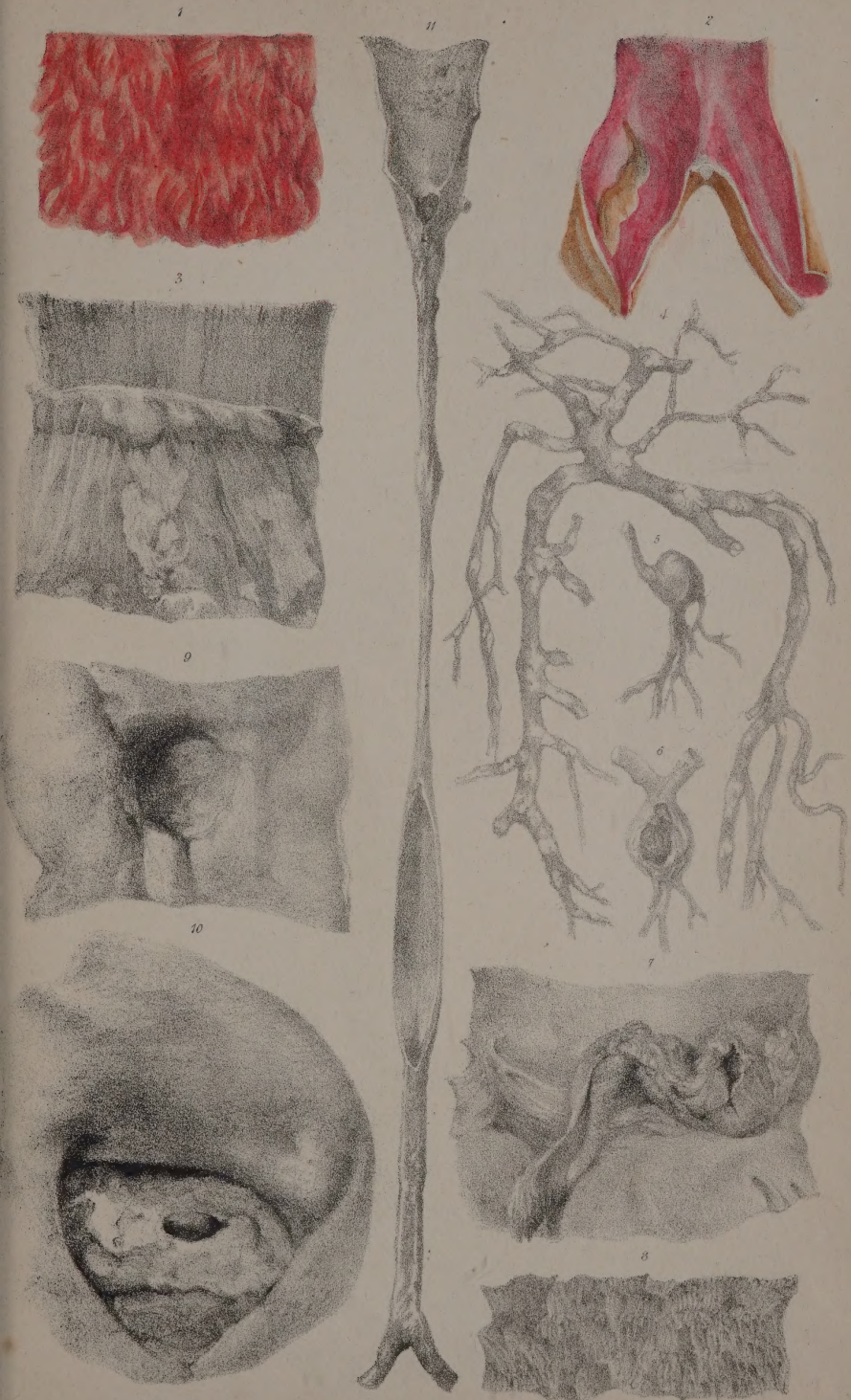
Arterial Tree,

The Figures indicate the order of frequency of the different situations of Aneurysm











PREFACE TO THE APPENDIX.

Four years have elapsed since this Essay was published, and I am about to add the information and experience I have acquired during that period.

Although this work includes a table of 551 cases of aneurism,—obtained the Jacksonian Prize at the College of Surgeons,—was well spoken of both in the British and Foreign Journals, I am not aware that it has ever been quoted by one of the so-called upper grade. Mr. Hodson's Jacksonian Prize Essay, 1815, is still the authority of our hospital magnates; and his table of 63 cases of aneurism is their statistical guide. Mr. Hodson belongs to a certain *clique*, and has not fallen into the fatal error of placing the medical and surgical aneurisms in the same category. In this country the heart and aorta, the very fountains and mainsprings of life, do not concern the *surgeon*; he must call to his assistance the *physician* to investigate *their* diseases.

Far be it from me to undervalue the merit of Mr. Hodson's Treatise; but it must be apparent to all that a work written thirty-five years ago, when the author was a very young surgeon, must contain numerous errors—errors which Mr. Hodson's subsequent experience has enabled him to correct. The reader must not suppose that I am blind to the imperfections of my own book; and it is not unlikely, in the course of this investigation, that I may obtain positive evidence of the incorrectness of some of my conclusions.

In this country a man must generally be attached (by purchase) to an hospital, before his works can obtain celebrity; and in surgical treatises such a position is almost essential to their extensive circulation. Although I can boast of no such appointment, I conceive in these enquiries that I have one great advantage over those who are so elevated. I have been able to collect information from *all* sources; to see and judge for myself by visiting the hospitals, schools, and museums of England, Ireland, Scotland, and Paris. I have not been crippled by the etiquette that would, to a certain extent, preclude one hospital physician, or surgeon, from speaking of the practice of another; and I need scarcely remind the reader that the experience of one man on most subjects connected with the diseases and injuries of the arteries is as the drop of water to the ocean—it adds to its bulk; but the increase is imperceptible. My object has been to collect these scattered drops, and, by adding them together, to form such a fountain of knowledge as may benefit medical science. If the hospitals of London were properly regulated, all the medical and surgical officers would be compelled to publish a statistical account of their cases; but, up to the present time, there is scarcely one of these institutions that can furnish the enquirer with statistical information, worth quoting, upon any single disease.

I now proceed to make such *practical* additions to the Essay as subsequent reading and experience will warrant. I shall avoid as much as possible all theoretical and speculative points, and endeavour, as heretofore, to substantiate my opinions by numerical data. For the sake of brevity the statistical information will not be continued in the tabular form. I shall also endeavour to enlarge more particularly upon those lesions which are generally considered to come under the department of the physician; and, if my health and strength should be spared, I hope to complete the subject in a few years, by adding to it a treatise on disease of the heart.

21, Parliament Street,
April 14th, 1851.

STRUCTURE OF ARTERIES.

I have but little to add to the account of the structure of the arteries and veins. Subsequent researches have not enabled me to discover two of the coats described by Henle (the epithelial and granular); and many, whose microscopical investigations are better worthy of note, are in the same state of darkness respecting them. As regards the existence or non-existence of the epithelium, I conceive that it can be a matter of no moment; but the question of the muscularity of the arteries is one of *practical* importance: and as my desire in this Appendix will be to keep as much as possible to *practical* points, I shall endeavour to enter more fully into the subject.

In addition to my experiments and remarks on the yellow or elastic coat of the arteries, I may observe that this structure bears a greater resemblance to India rubber than to any other substance: when dried it cannot be elongated; but if folded in a cylindrical form it returns, if unconfined, to its former shape. In the dry state it is very brittle and transparent. On holding it to the light the fibres may be seen passing in a circular direction. After being kept dry for many years, and then immersed in water for a short time, it will resume its natural elasticity. The artery I am experimenting upon has been in my museum for six years.

The cellular coat, when extended and dried, resembles in appearance the web of some species of spider, or the cocoon of the silkworm. It is extremely tough, and from its reticulated and felt-like tissue, it is capable of great extension; but it has not, like the elastic coat, when distended beyond a certain point, the power of contraction. It is in this coat I believe (as many have before supposed) that the tonicity of an artery is seated. I have nothing to add here to my former description of the serous or subserous tunics, nor to the account of the structure of the veins; but in the pathological part of the Appendix I shall have occasion to allude to the structure* of the serous membrane.

If I were disposed to quote the various opinions upon the arteries which have been broached, even during the short interval that has elapsed since my former description of these structures was written, I could add largely to this treatise, but it would lead to no practical good. Mr. Guthrie, in a lecture at the Medical Society of London (Lancet, Feb., 1851), which should have been called Mr. Quekett's Letsomian Lecture, has described, like Henle, six arterial tunics, although in his work on the Diseases and Injuries of the Arteries, 1831, he enumerates only *three*. In his subsequent treatise, in 1846, he keeps to the same number; and he describes the cellular coat as *especially elastic and retractile* (page 8). I mention the circumstance because I consider this point to be one of great *practical* importance. I believe I was the first to describe the cellular coat as nearly *inelastic*; and it is the want of retractility, as I have stated (pages 7 and 293), in this tunic, that forms the greatest safeguard when an artery is torn or divided. The serous and yellow coats retract, the cellular (in torn arteries) is elongated, and by this means forms a kind of funnel-shaped covering to the mouth of the vessel. The arrest of hæmorrhage by torsion, I believe, is due to the same cause. Mr. B. Cooper, in his Surgical Lectures, recently delivered at Guy's Hospital, and published

* I can now refer the reader, in the College Museum, to two of the 21 preparations which accompanied the Essay, and which show the structure of the arteries. They are between specimens 942 and 943, but without name or number. See letter to the Council, vol. 1, Appendix, p. 12, of the "Examiner."

in the "Medical Gazette, 1849," (p. 881), speaks of this coat as the "cellular or elastic coat;" and, he says, "if an artery be much stretched, or tightly compressed, by ligature, its middle and internal coats give way—the external coat, from its superior elasticity, may again recover its normal condition." I scarcely need comment on the absurdity of this statement.

Mr. Wharton Jones, who has lately gained the Astley Cooper Prize of £300, on the state of the blood and blood-vessels in inflammation, describes the arteries of the frog's foot (upon which his experiments were made) as composed of three coats, and plates are given to show the middle or muscular coat in a state of contraction. Mr. Jones, in speaking of one of his experiments, says, "From the cessation of the flow of blood in the vessel, and the transparency of its coats, the artery may for the time not be distinguished from the surrounding structures." But it is difficult to understand, I think, how a microscopist can accurately distinguish the structure of the coats of arteries in the tubes of which the average diameter does not exceed 1-1000 of an inch.

Mr. Quekett, whose patient researches and laborious investigations deservedly give weight to his opinions, believes also in the muscularity of the arteries; but I think that the majority of physiologists are opposed to Mr. Quekett upon this point. When in Edinburgh, in 1848, Dr. Hughes Bennett was kind enough to invite me to a lecture on the Structure of the Arteries, and he, like Mr. Quekett, described six tunics; but he admitted that he had only seen four of them. Dr. Bennett concluded his lecture by the astounding assertion, "that Hunter's doctrine of the muscularity of the arteries, and Cullen's notion of spasm of the extreme vessels, were correct;" but to my eyes, the very evidence that Dr. Bennett's microscopes were supposed to afford of the muscularity of the arteries was conclusive of their non-muscularity. When obstruction took place in the capillaries of the frog's foot, the *vis a tergo* being the same, the vessels appeared to be more active; but it was the action of the heart (I believe), and not the muscular contraction of the capillaries. The tied and throbbing arteries of a stump, seen after amputation, are surely not self-acting; the blood is propelled against their extremities, and hence the reaction and throbbing. Let us test the doctrine of the muscularity of the arteries by common sense, an ingredient, I think, that is often wanting in microscopical deductions, both physiological and pathological.

We are told by some microscopists that the involuntary muscles of the intestines, and that of the arteries, present the same appearance under the microscope. I find, however, that the smallest fibre of this supposed muscular coat of the artery is highly elastic, and that it will retain its elasticity for many months if kept moist, but the muscular coat of the intestine scarcely possesses any elastic property; am I then justified in subscribing to this microscopical dogma of identity of structure? Again observe the peristaltic movements of the involuntary fibres of the intestines, and what analogy is there between their action and the pulsatory movement of the arteries? But endeavour to bring arterial muscularity to bear on the circulation of the blood, in any way you please, and you stop the current. Muscularity and elasticity are incompatible; they could not, I believe, act together in a cylindrical tube. It is true that the *ligamentum nuchæ*, which has a structure identical with the yellow coat of the arteries, is entirely passive, and influenced solely by the muscles; but this combination of action surely bears no resemblance to the supposed musculo-elasticity of the arteries.

Another insurmountable difficulty to the advocates of the muscularity of the arteries, is the absence of fibrine in the supposed muscular coat, and the want of contraction on the application of galvanism. Contraction is said to have been produced on the smaller arteries, by the use of this agent, by Van den Bosch, and Rossi: Müller, Weber, and others have tried it on the larger tubes without effect; but the Webers have since succeeded in reducing the mesenteric arteries of the frog to one-third of their diameter (Müller's Archiv, 1847, No. 2). But I need not remind the reader that *all* experiments made upon such minute vessels must be inconclusive, and that *contractility*, does not prove *muscularity*.

What aid does pathology afford to the advocates of muscularity? Blushing say they (which is a momentary inflammation of the cheek and neck), must arise from increased action of the vessels of the part, and, as far as I know, this argument has never been properly combated. But did any person I ask, ever blush without the heart's action being instantly increased? Again, the small vessels and capillaries of the cheek differ from those in every other part of the body. In some persons they are always distended, in others, no red blood is perceptible in them; and after a certain age, when they lose their elasticity, blushing is not seen. It is also probable, as I shall have occasion to mention hereafter, that the *tone* of these and all other vessels depends upon the supply of nervous fluid to the outer or cellular coat affecting their tonicity, and consequently their caliber. Inflammation, the great disorganizer of structure according to the language of the schools, arises from increased action of the vessels of the part, but I believe, (as I stated at the Medical Society of London, ten years ago), that inflammation is essentially a process of stagnation, a stoppage of the blood corpuscles in some of the capillaries, and this supposed increased muscular action of the vessels arises from the same cause that produces the throbbing of the arteries of the stump. The force of the heart is the same, but the blood does not find its way through the same channels, and the opinion of Hunter, that more blood passes through an inflamed part, I believe to be untenable. *The surrounding vessels are more distended, and probably convey a larger amount of blood; not so the inflamed capillaries.*

As regards the supply of nerves and blood vessels to the arterial tunics, these are questions I think that will be more advantageously discussed, when the pathology of these structures is further investigated; and as I proceed with the structural changes in the blood vessels, I shall endeavour to illustrate their physiology.

MORBID CONDITIONS OF ARTERIES.

In addition to the observations I have already made respecting the morbid conditions of arteries (page 8), there is one subject that especially requires further notice, viz.: what is called fatty degeneration, a change that is supposed by many to be essentially connected with the atheromatous and bony deposits. I have, however, (page 71), come to the conclusion that this oily and fatty condition in old age, rather serves to prevent the preternatural dryness of the arterial tunics; an opinion formed by deductions from a large number of cases of aneurism, which clearly show, that as the fatty or earthy deposits increase, so does the tendency to the formation of aneurism diminish. This doctrine will be considered heterodox and untenable by those who look to fatty degeneration as the cause of many fatal pathological changes. But let us enquire farther into the subject, and we shall find, I think,

that although a fatty condition of the liver and other organs is very common, it is generally the result of deranged structure and impaired function of the lungs and other parts, when occurring at an early period of life. But this condition must not be confounded with what is called atheromatous, or fatty deposit in the arteries. The one has little or no connexion with the other. In old age there is a *general* deposition of fat—in the cases alluded to it is only *partial*. All we know of fatty deposits, both in healthy and diseased structures, tends to confirm the opinion, that these depositions are the result of a slow or impeded circulation; accompanied *generally* with some alteration in the constituent parts of the blood. The animal that is kept at rest, with its circulation in a quiet state, fattens more quickly than the one that takes exercise. The fatty degeneration of the muscular structure of the heart I believe is almost invariably produced by ossification of the coronary arteries. The *arcus senilis* by the partial closure and drying up of the capillary vessels. I have before stated, no example can be adduced of the conversion of fat into ossific matter, but abundant evidence is afforded of the former deposit being the result of a long and inelastic condition of the arterial tubes. It will naturally be said, that we have positive evidence that fatty degeneration is the cause of ruptured heart. But this lesion is very rare, and probably in 500,000 fatty hearts, it would not be met with in more than one, and the same remark will apply to fatty arteries. These are exceptions, not rules.

But what reasonable proof can be adduced that these deposits, whether fatty, bony, or atheromatous, are often the means of prolonging life, and of keeping up that balance in the animal machine so that one wheel may keep pace with another? Human bodies, like all living structures, are formed to last for a definite period; and it is a law of nature that certain changes, tending to decay and death, should take place in these bodies, which, like inanimate matter, are influenced to a great extent by external agents that hasten their decomposition and destruction. It is, I think, taking a very superficial view of this question to regard the arteries alone; and there is not, probably, a greater error committed by pathologists than that of overlooking the fact that, what is often called *disease*, is a salutary disorganization to regulate functional balance, and to maintain that equality of power so essential to the proper performance of the various functions of the body. The elastic artery would ill accord with the worn-out heart—the thin and flabby ventricle with the diseased valve—the strong and healthy stomach with the sluggish and diseased liver—acuteness of vision with dulness of intellect—the ossified artery with the dry and oilless muscle. It is not improbable, moreover, that this increase of fat and oil in the bodies of the aged serves to keep up the temperature, and by that means also, to prolong life.

I have recently had an opportunity of examining the bodies of two persons (in the same week), that afforded a contrast that is seldom met with. The one with Mr. Webber, of Connaught Square, the other with Mr. C. Taylor, of Camberwell. The first was a young gentleman, æt. 19, who was found dead in his bed. He had been for several years labouring under palpitation of the heart; a quick irregular pulse, generally too rapid to count; purring tremor, and increased impulse, so that his shirt-collars were moved by the heart's propulsion. These symptoms were accompanied with dyspepsia. Mr. Webber and others thought there was hypertrophy of the walls of the heart, whilst some who saw him supposed the derangement only functional. The peri-

cardium contained about 2 oz. of serum. The parietes of the heart were generally thickened; and this organ probably weighed about 16 oz. The left ventricle was so dilated that its cavity would hold three hen's eggs; the curtains of the mitral valve, and the carnæ columnæ, greatly elongated and enlarged. But the valve, in consequence of the increased size of the auricular-ventricular cavities, only partly performed its office, and the column of blood lost its natural support; and from this disproportion of parts arose the cardiac disturbance; and the fatal termination. There was no fat in the muscular structure of the heart; the arteries and all the organs examined were perfectly healthy. There was not a trace of *disease* found; and the brain, which unfortunately was not examined, is scarcely likely to have been in a diseased state.

The other case was that of an old lady, æt. 88, whom I saw with Mr. Taylor, a few days before the autopsy. She was unmarried, very tall, had generally enjoyed good health, and was descended from long-lived parents. Mr. Taylor was called to her in November last, when she had a large deep ulcer on the left leg, which had existed for several years. Early in January the lower part of the wound began to slough, and gangrene of the foot ensued. A line of demarcation was formed; and in February, spontaneous amputation of the foot, at the ankle-joint, took place. There were also gangrenous sloughs over the sacrum, and on the knee of the affected side. She died on the 5th of March from exhaustion. It is remarkable that during this extensive sloughing of the soft parts, and separation of the bones of the foot, that she never complained of pain. It must be observed, however, that the case was not one of dry gangrene and arteritis.

The external surface of the body (seen at the autopsy 12 hours after death) presented nothing remarkable. The integuments were flabby, and covered a layer of fat. This substance appeared to pervade nearly every tissue of the body. The arteries of the lower extremities were imbedded in it; and their coats, as well as those of the arteries of the chest and abdomen, were saturated with an oily fluid. The heart weighed about 9 oz.; the sides of the left ventricle were slightly increased in bulk; and the muscular structure generally fatty. Both coronary arteries were ossified. The semilunar aortic valves were free from deposit; but they were thick, dry, and parchment-like, and stood out, so that their convex edges approximated. The thoracic aorta contained a few patches only of bony deposit; in the abdominal aorta, especially near its bifurcation, these were more abundant, and several bony plates were present in the external and internal iliacs. The femoral artery was nearly free from deposit, as were also the anterior and posterior tibial; but in the former artery, when dry, ossific granules were seen. The pulmonary artery, the venæ cavæ, as well as the femoral and saphena veins, presented no trace of deposit, and none could be felt (through the skin) in the radial arteries. The valves of the saphena and femoral veins were dry, and adherent to the lining membrane; they had entirely lost their office. Along the course of the posterior tibial arteries were several firm bodies, about the size of large peas, with two curled tapering extremities. These were composed of blood corpuscles, and lymph; and they were enclosed in distinct fibrous cysts. I carefully examined the tarsal, and internal and external plantar arteries of the gangrenous foot; their coats, like the surrounding structures, were of a dark colour, but I could discover no disease in them.

Of the two individuals above-mentioned, the arteries of the former resembled the young and elastic sapling; whilst those of the latter may be compared with the dry and withered branches of the sear-oak. Life's time-piece—the heart—in the youth,* perhaps, was congenitally mal-formed; or the harmony of its structure deranged by mental or bodily efforts, undertaken before the organ had attained its full development and strength. The old lady, on the other hand, with a constitution originally good, and in her sphere of life less exposed to intellectual and physical evils, lived to a ripe old age; and, without speaking irreverently, rotted long before the vital principle had left her body. In the one instance the thread of life was early snapped by a want of equipoise in the heart's mechanism; in the other, nature's balance was kept up in all the organs of the body. There was no disproportion of power; and the rusty and worn-out machinery was well lubricated with oil and fat. Clog-wheels and safety-valves existed in the arteries to diminish their elasticity and force, so as to render their power commensurate with the supply of blood required by the secretory apparatus. These two cases, if *well studied*, would afford *practical* matter for a larger volume than has yet been written on the physiology and pathology of the blood vessels.

I am far from asserting that a fatty condition of the heart may not be a more frequent cause of death than has hitherto been supposed; indeed, we have positive proof that in the vast majority of cases of rupture of this organ, that there is fatty degeneration of the muscular fibre. When I showed the specimen of rupture of the left ventricle (*Examiner*, vol. I., p. 160), at the London Pathological Society, November, 1846, I stated (*Transactions*, p. 62), "that from the examination of a few specimens I had made, of spontaneous rupture of the heart, I thought that fatty degeneration was generally present in these cases." Dr. R. Quain, in his interesting paper on "Fatty Diseases of the Heart" (*Med. Chi. Trans.*, 1850), has gone fully into the subject of this degeneration, which, no doubt, in many cases, leads to premature dissolution. But the question I ask is, not whether this fatty degeneration in the heart and arteries is the immediate cause of death in some cases, but whether it does not *generally*, in the aged, tend to prolong life, by adapting the frequency and force of the heart to the requirements of the system? In the case above alluded to, the gentleman was 73 years of age, and had enjoyed good health, but he died of rupture of the heart from fatty degeneration. Who can say that this senile change did not prolong life? that a vessel of the brain might not have given way at an early period, if the heart had been strong and vigorous? In the case before-mentioned (p. 71), of rupture of the heart from fatty degeneration, the patient was 90 years of age, and a table-spoonful of limpid oil flowed from the vena cava.

* Since the above was written I have learnt from Mr. Webber a circumstance that adds much to the interest of this case. When about four years of age, the child's nurse held him over a well, and threatened to throw him in. After this he had, for a long time, such a dread of water that, when travelling with his father and mother in a carriage, he would get out and cross the foot-bridge rather than pass through the stream in the carriage. This fright is supposed by his friends to have occasioned the heart affection.

The history of the examination of Old Parr (*Phil. Trans.*, vol. 3), who lived to the age of 152, is a very interesting one. It is doubtful whether Harvey was present at the examination of the body, although the account is said to have been written by him. The arteries* are not mentioned, but the heart was great, thick, fibrous, and fat; the kidneys covered with fat, and the cartilages of the sternum, flexible and soft. Unfortunately the body of Henry Jenkins, who died at the advanced age of 169, was not examined. In Dr. Keil's account (*Phil. Trans.*, 1704, p. 2247) of the dissection of John Bayles, the button-maker, of Northampton, who died at the age of 130, the heart is said to have been large, thick, and fat; the diameter of the thoracic aorta, near the carotids, was two inches. The abdominal aorta, and the iliac arteries, were for the most part *cartilaginous*. There was also a small ossification of the dura mater. Dr. Keil attributes his death to thinness of the stomach and hardness of the aorta. These arteries, probably, when dry, would have formed bony tubes.

I have lately been occupied in the examination of the radial arteries of old people; and as these branches are probably less subject to ossification than any of the arteries of the limbs, we may infer that when the ossific deposit is present in them, that it exists to a greater extent in the larger arteries. In speaking of ossification of the radial arteries, it must be understood that I have never found these tubes converted into *cylinders* of bone in the living subject, although when dried, after death, they would often present this appearance. The deposit is in rings, or patches, which are situated at a greater or less distance from each other. Sometimes only one artery is ossified; and the right, I believe, is more frequently affected than the left.

Through the kindness of Mr. Lowne, Surgeon to the Walworth Poor-house, I have examined the radial arteries of eight men and ten women. The ages of the former amounted to 70, 73, 75, 78, 80, 84, 84, 90; of the latter to 75, 75, 75, 78, 79, 79, 83, 84, 85, 88. In the eight men the radial arteries were bony in three, thickened in two, and apparently healthy in three. Amongst the ten women two had slight ossific deposit, in two both arteries were thickened, in one the right only, and in six the arteries appeared to be healthy. Two of these eighteen persons had these arteries tortuous.

My friend, Dr. Bainbridge, who is Surgeon to the large Poor-house of St. Martin's in the Fields, has permitted me to examine the aged paupers in that establishment. Of sixteen men, whose ages were 70, 71, 72, 74, 76, 77, 78, 78, 78, 79, 80, 80, 83, 84, 86, 87. There was ossific deposit in three: these arteries were more or less thickened in eight; apparently healthy in five, and in three they were tortuous.

* I believe I have seen a statement somewhere, that the arteries of Parr were converted into bone; but as these vessels were not noticed at the autopsy, it is not unlikely that I have confounded the case of Parr with that of some other person of advanced age. If the radial arteries of Parr were bony, it is most likely that the fact would have been noticed by some of those who felt his pulse, as he must have been an object of great curiosity to members of the medical profession. I have in my possession a copy of *Hodgson on the Arteries*, which belonged to the late Mr. Langstaff. It contains several of his manuscript notes. He says, "I have seen the radial arteries in two subjects converted into bony tubes."

The ages of the thirty-two women examined were 70, 72, 73, 73, 74, 74, 75, 75, 75, 76, 76, 76, 77, 77, 77, 77, 77, 78, 79, 80, 80, 80, 80, 80, 82, 84, 85, 86, 87, 88, 89, 90. Three of these had ossific deposit in the radial arteries to a slight extent; in fourteen the tubes were more or less thickened, and in the remaining fifteen, they appeared to be free from disease. In three of the above the arteries were tortuous.

Dr. Beith, one of the Surgeons of Greenwich Hospital, allowed me the privilege of examining the old sailors in that institution, and I probably felt the radial arteries of more than a hundred men beyond seventy years of age, and their conditions varied as in the above instances. I select a few of the cases, C. R. æt. 86, both arteries bony. C. A. æt. 80, both arteries bony: has been subject to gout, and has taken mercury several times. W. A. æt. 89, both arteries ossified and tortuous. W. D. æt. 72, a little deposit on both arteries. D. G. æt. 86, the arteries in the same state as the last. R. G. æt. 72, both arteries bony. In four others both the tubes were a little ossified, and in two, the deposit was confined to the right artery. In one man, æt. 94, both the arteries were sound, and in another, who was 93 years of age, the left was bony. W. Strickley, æt. 103, had the arteries free from deposit.

As regards the *arcus senilis*, it was more or less developed in all; but I am unable to make out that its size in old people is an indication of debility or want of power in the circulating organ. A physician, who has now attained his 82nd year, who is well known to the profession, and is one of the healthiest men of his age I have ever met with, has the arcus developed to a great extent. Its early appearance in the young, as supposed by Mr. Canton, and Drs. Williams and Quain, may be indicative of a fatty state of heart, but at present, I think the evidence is inconclusive.

I could add largely to the Table of 102 inspections, (p. 11,) I have recorded of the arteries of the chest and abdomen, but this addition I find would serve no useful purpose. I see no reason to alter the opinion I have before expressed respecting the origin of arterial deposits, (p. 67,) viz., that they are generally occasioned by congestion or inflammation of the capillary vessels or channels that convey the serous part of the blood, and that they are seated under the inner coat of the artery, and not upon it, as Rokitansky and others have asserted. That these deposits are more frequent in persons of advanced age, and in those who have the cutaneous transpiration diminished or suppressed. That individuals of scrofulous or gouty diathesis, and those who labour under granular disease of the kidney, are *probably* more liable to them, and that the bony depositions are more commonly met with in the strong and vigorous who attain a great age.

As regards the effect of mercury in the production of arterial disease, I may mention in addition to the evidence adduced at page 116, that I have now a man under my care at the Dispensary, æt. 51, who labours under partial paralysis of both hands, and mercurial trembling: his habits have been intemperate: at the age of fourteen he was apprenticed to a looking-glass gilder, and after a few years he got into his present state, and has remained so ever since: both radial arteries, judging by the finger, are free from disease, but there is a rough sound over the aortic valves. In my investigations respecting the condition

of the radial arteries of old people, above-mentioned, I endeavoured to ascertain whether they took mercury at any period of their lives: many were unable to answer the question, but several who had reached a great age had been salivated by this mineral, although these formed, especially amongst the women, a small proportion. I think we possess no evidence at present to show, that arterial deposits owe their origin to the administration of mercury; but it is more than probable that alcohol, both by its influence upon the blood, as well as its tendency to increase mental and bodily effort, is the most powerful agent, in cold and temperate climates, in the production of these changes in the arteries. As I have observed before, it is important to distinguish between the atheromatous deposits found sometimes in early life, and the bony inelastic, and fatty impregnation of the arterial tubes generally met with in old people. I may also repeat, that the atheromatous and ossific patches are not essentially fatty, for, as I have remarked, (p. 79,) the cholesterine and fat are much less abundant than the other constituents.

There is one condition of the radial arteries that I believe has not been alluded to by any previous writer, viz., the tortuous and zigzag state of the tube. The coats of the artery in all the cases I have seen have been thickened, and most of the patients have laboured under hypertrophy of the left cardiac ventricle. The meandering stream often seen flowing from angle to angle, through the meadow, is a good representation of this change in the blood-current, and, on watching the artery, the impulse is chiefly perceptible at the curve. I will mention briefly two or three cases among several that I have lately met with at the Metropolitan Dispensary. M. B. æt. 62, has both the radial arteries curved in the manner described: she has had several attacks of inflammation, for which she has taken mercury to salivation: has also suffered from great mental anxiety. Palpitation of the heart has existed for several years, and the ventricular impulse is now greater than natural, but there is no abnormal sound.—Mrs. F. æt. 59, has the same condition of artery, and it exists to a much greater extent in an old lady 81 years of age. Both the last patients are suffering from bronchitis, and in both, the impulse of the heart is increased, and the first sound prolonged.

One of the best collections I have seen of diseased arteries is in the Chatham Museum; and those who are interested in these lesions will find numerous specimens. The London Hunterian Museum also contains some curious preparations of this kind. Those numbered 1597, 1607, 1608, 1611, 1612, 1613, 1614, 1617, 1618, 1619, 1625, 1627, 1628, 1629, are good examples of these changes, but unfortunately the histories of these cases are but imperfectly recorded. The Museums of the Colleges of Surgeons of Dublin and Edinburgh are also rich in these preparations. In the latter museum the specimens 1184, 1185, 1180, 1181, 1174, are well worthy of notice. In preparation 1174, the ossific deposit appears to me (as in case 41, p. 14, and plate 4, f. 9) to have arrested the progress of dilatation of the arterial walls.

Ossification of the Pericardium.

At page 73 I have alluded to ossification of other parts, for the purpose of showing the analogy between the isolated deposits of bone

in the arteries, and in other organs. Occasionally a portion of the abdominal aorta only is found ossified, the thoracic being free from disease, and *vice versa*. Before I quit this subject I am induced to mention the following example of ossification of the pericardium, which I saw with Mr. Skegg, of St. Martin's Lane, in July, 1850, because I believe, considering the age of the patient, it is *unique*. Mr. Skegg has been kind enough to furnish me with the subjoined outlines of the case.

"E. B., æt. 11 years, in February, 1844, became the subject of a severe attack of acute rheumatism. A fortnight from the commencement of the attack, pericarditis supervened, which was treated by leeching, blistering, mercury to ptyalism, colchicum, &c. The following May the medical attendance ceased. Auscultation evidenced fibrinous deposit in the pericardial cavity; turbulent cardiac action, with dyspnœa on increased exertion. In all other respects he enjoyed tolerable health, until November, 1845, when pain in the region of the heart required antiphlogistic treatment and blistering for a short time. September, 1846: he became the subject of a severe attack of hæmoptysis, which, being subdued, was followed by ascites, which was with much difficulty removed by diuretics. In June, 1847, ascites re-appeared, but was again removed by diuretics. In September, 1848, he once more became the subject of dropsy, which lasted several weeks. Again, at the close of 1849, ascites re-appeared, accompanied by a severe attack of hæmoptysis, which for several days threatened his existence, but was ultimately stayed by the gallic acid and lead. His sufferings during the last three years had been very severe; from this date (November, 1849) they were dreadfully so, frequently passing several successive nights in a chair. Great abdominal distension, attended at times with severe pain in the epigastric region, and œdema of the lower extremities, and infiltration of the scrotum, enlarging it to the size of an infant's head. Punctures with a needle afforded some relief. A more severe attack of hæmoptysis took place in July, which lasted ten days. It now became evident that the manifold and long-continued sufferings of the patient were drawing to a close. The dyspnœa became painfully urgent; the ascites was no longer amenable to medicines; every known diuretic failed to act on the kidneys; the violent action of the heart, to use his own words, 'appeared as if it would burst through his chest,' prevented his sleeping. Death was earnestly prayed for by the sufferer, who died rather suddenly on the 11th of September, 1850. Repeated auscultation led to the conclusion that pericardial adhesion existed, with hypertrophy of the heart. Some disease of the valves was suspected. During the whole of his illness the pulse maintained a strong, full, and rapid beat, but perfectly regular, which lessened the suspicion of valvular disease. The carotids and cerebral arteries beat violently; and this palpitation was the cause of much distress to him. Bleeding from the arm was more than once tried; but the patient, declaring himself worse from the operation, it was not allowed to be repeated. A dry cough repeatedly harassed him, more especially towards the close of his existence. Notwithstanding his sufferings he grew in stature, being at the time of his death six feet high.

Autopsy. By Messrs. Canton & Skegg, 36 hours p. m. The

pectoral and abdominal muscles well developed, a moderate quantity of adipose substance covering them. On attempting to raise the sternum, after dividing the costal cartilages, and dissecting off the attachment of the diaphragm, the separation was found to be impracticable, being firmly bound down by a thick fibrinous membrane, which required dissection from the entire posterior surface of the sternum. The fibrinous membrane was firmly attached to the pericardium, and the thoracic fascia covering the large vessels, suggested the idea of an hypertrophied thymus gland.

Lungs. The anterior margins adherent to the pericardium and their outer surface so firmly adherent to the pleura costalis, as to defy other means than the scalpel for their separation. The thoracic fascia pericardial covering of the great vessels amazingly thickened. Recent lymph on and between the folds of the intestines. The *omental margins* curiously turned up. The liver hypertrophied, apparently from increase of Glisson's capsule: its anatomical characters as to shape, destroyed; no acute margins; rhomboid in form, and firmly adherent to the diaphragm.

Kidneys rather larger than normal, but free from disease. *Spleen* much enlarged, and firmly adherent. *Bladder* extending nearly to the umbilicus; adherent to peritoneum, and curiously elongated in consequence of the adhesions."

I was unable to attend the post-mortem examination, in consequence of absence from town, but I was present at the Pathological Society, when Mr. Canton exhibited the heart and pericardium, and through his kindness, I have since been enabled to make a more careful inspection of the parts.

The heart weighs 14 ozs. The left ventricle dilated, and its walls much thickened; the curtains of the mitral valve also thickened. The pericardium universally adherent to the heart, and that portion of it over the mitral and tricuspid valves is converted into a thick bony ring, which entirely surrounds the heart; it is $10\frac{1}{2}$ inches long, and varies in breadth from one to two inches; it is firmly united to the cardiac pericardium, by means of false membrane; the aorta of a natural size, and free from deposit. Other parts normal.

When I saw this patient with Mr. Skegg, I supposed with him, that there was great hypertrophy of the left ventricle of the heart, and disease of the aortic valves, the result of previous inflammation and of inordinate action. The *bruit de rape* was heard over the upper part of the heart, but no purring-tremor was present. The file-sound was probably occasioned by the bony deposit.

The peculiarity of the above case is the age of the patient, and I am not acquainted with any other instance of ossification of this membrane at so early a period of life. Morgagni in his 22nd Letter, c. 10, relates the case of a man *æt.* 30, who, after fever, had oppression at the chest, with general *œdema*. The pericardium was universally adherent to the heart, and in some parts it was cartilaginous. Seiler, in his *Anatomie corporis humani senilis specimen*, 1749, p. 92, refers to cases of ossification of the pericardium in old people, mentioned by Haller, J. G. Walter, and Bonetus. Otto, in his *Compendium of Pathological Anatomy*, (South's Translation, p. 257,) alludes to instances related by Sénac, Saviard, Aurivillius, Pasta, Prost, and Rayer. I have seen

a good specimen in the Museum of the late Mr. Langstaff, but no history was attached to it; it is now in the Hunterian Museum, p. 1516. There is another in the St. George's Hospital Museum. In the Museum of the College of Surgeons at Edinburgh, prep: 1005, shows ossification of the pericardium over the right ventricle. In the Chatham Museum there are two specimens, (62, 63,) in one the ossific matter is three inches in length, and a quarter of an inch in thickness; in the other, it nearly surrounds both auricles. *M. Verneuil, Gazette Medicale, de Paris, 1850, p. 557*, relates a case of ossification of the endocardium, situated over the border of the right auricle. There was also rupture of the auricle. The woman, æt. 70, had had acute pericarditis at a former period. In the Glasgow Hunterian Museum, preparation 66, shows a large ossification in the substance of the heart round the mouth of the left ventricle, from a fat woman, in whom the arteries of the uterus and brain were also ossified.

Arteritis.

There is scarcely a subject connected with pathology that is less understood or studied than arteritis, and I am compelled to make the same remark as I did when treating of this disease before; that the morbid conditions of arteries are but little attended to, and in the great majority of post mortem examinations these vessels are not inspected: the upper part of the aorta is sometimes examined, but the descending thoracic and abdominal portions, as well as the larger arteries of the limbs, are rarely looked at. I could adduce many examples of gangrene of the extremities where the arteries have been superficially examined near to the gangrenous part, but the tubes some way above the mortification, where the plug is often seated, were unnoticed. In the living body what valuable assistance may we derive from the careful examination of the arterial and venous trunks? How many thousands of legs and arms have been amputated, and the surgeon has not taken the trouble, nor considered the importance of examining the femoral or brachial arteries before the operation? What a useful lesson does the case of gangrene of the leg, recorded in the first volume of the Examiner, (p. 152,) teach us. Both femoral arteries are plugged: a surgeon cuts off the leg; and the patient dies in three days with a sphacelated stump; the almost certain result of amputation performed under such circumstances. I am not acquainted with a surgical writer who has especially inculcated the necessity of a careful examination of the arteries before amputation of the limbs, and I believe that I have seen fifty legs removed without this inspection having been made in a single instance. Again, in all affections of the brain, how important is it to investigate the state of the carotids; to observe their force; to ascertain whether their power is equal, and whether the pain in the head, or the singing noise in the ears, is removed by the compression of one or both these vessels. In aneurism of the arch of the aorta how necessary is it to note the state of the vessels of the neck, and the condition of the arteries of the arm; if there is a want of correspondence between them, a mechanical obstruction may be suspected, for, *I believe there is no well-authenticated case on record, of the local absence of pulsation in an artery, without a mechanical cause.*

I have been induced to hazard the above remarks, believing that this mode of diagnosis is one that has hitherto been much neglected.

As my object in this, and in the subsequent chapters of the Appendix, will be to include only such matter as I think practically useful, I need not again enter into the causes, diagnosis, and treatment of arteritis, especially as I have but little to add to the opinions already expressed.

Aortitis.—As regards the diagnosis of this disease, I confess myself as much in the dark as ever respecting it; nor do I believe that there are any positive signs by which it can be distinguished. Gendrin, in the *Gazette Médicale des Hôpitaux*, Paris, 1850, has published some interesting papers on arteritis, which he divides into three forms:—1. That in which all the tunics are more or less affected; 2. The valvular; 3. The aneurismal. In the acute arteritis affecting the larger vessels, especially the aorta, he describes a tumultuous action of the heart; a small pulse; and a disposition to syncope, as the most prominent symptoms. He relates the case of a man under his care, who died of aortitis; fibrinous concretions adhered to the semi-lunar valves, and to the lining membrane of the aorta.

Professor Virchow (*L'Union Médicale*, Paris, 1850) has instituted several experiments on the arteries of dogs, by irritating them in various ways; and in no instance did he produce exudation of lymph from the serous membrane of the artery. He concludes that the fibrinous deposits are from the blood within the vessel, and that they are often formed in or near the heart; then carried into the smaller trunks, where they plug up the tubes, and by arresting the circulation produce gangrene. I am not prepared to deny that lymph may not sometimes be transposed in the manner described; but I suspect the circumstance is of rare occurrence, especially in the larger arteries; and nature's laws are too perfect to allow of such chances of obstruction to the blood current. What a wise and beautiful provision is it that pus, which courses through the veins with deadly and poisonous effect, is not formed in the arteries. How common are deposits of fibrin about the heart in acute rheumatism, in young subjects; but how rarely are these patients affected with gangrene. In the fourteen cases of gangrene of the extremities that I have related (p. 66), the coats of the arteries were often intensely red; the clot sometimes firmly adherent to the sides of the vessel, and never wedged in, as described by Professor Virchow. As regards the exudation of lymph, we have indisputable evidence, after the application of a ligature, or after violence done to the tube, of the deposit of fibrin, thickening of the middle and cellular coats; and the conversion of the artery into a ligamentous cord. These phenomena could not be effected without the presence of inflammation; and there is no reason, that I can discover, why this process should not occur spontaneously in arteries as well as in other structures. Whether lymph is *first* poured out from the serous membrane of the artery, is not, I think, a question of importance, so that we know that inflammation produces fibrinous coagula, and obstruction or obliteration of the tube.

The foregoing remarks it will be perceived are not irrelevant to the disease in question, viz., *aortitis*, about which so much difference of opinion prevails. The symptoms must depend in a great measure on the seat of the inflammation; its extent and acuteness of character. If the inflammatory action is confined to the aortic valves and endocardium, the rapidity of circulation orthopnœa, and disposition to syncope will probably be greater than when the lower part of the vessel is affected: the presence of previous disease, such as, atheromatous and bony deposit, may also add to the severity of the symptoms. The composition of the blood, too, may exercise some influence on the nature of the inflammation, and in those cases where the aorta and the larger arteries are generally inflamed and reddened, it is probable that the fibrin is less in quantity, and the plasticity of the blood diminished; much, however, connected with this affection, as I have said before, is conjectural and speculative.

I have not met with a well-marked example of acute inflammation of the aorta since I last wrote upon this subject, although the subjoined cases, by some may be considered to come under this head, and several instances of supposed aortitis have been published, whose authors have not had better evidence of the existence of the disease than these afford. Mr. B. Evans, of Trinity-square, allowed me the opportunity of seeing the following case in December, 1848. Mr. A. æt. 46, a warehouseman, had generally enjoyed good health until November, 1847, when in ascending some steps he found his breath short and quick, and after this he was affected frequently with palpitation of the heart and dyspnœa; he consulted Mr. Evans, and when I saw him with this gentleman, he had loud bellows' sound over the base of the heart and strong ventricular impulse. The pulse was intermitting at every twentieth beat. These symptoms continued, with occasional mitigation, until January, 1850, when he consulted a physician, who gave him very large doses of Iodide of Potassium, Sulphuric Ether, and Prussic Acid: he called upon Mr. Evans three weeks before his death, and told him "that the medicine had had such an extraordinary effect that he considered himself quite well." The same sound, however, was present over the region of the heart. A fortnight after his visit, Mr. Evans was called to him in great haste, in the night, and found him apparently dying. The difficulty of breathing, and orthopnœa, were extreme. Blood was taken from his arm, to relieve the oppressed lungs—ether administered at intervals; and to the surprise of Mr. Evans he rallied, and the next day he appeared much better. A week after this attack he died rather suddenly. I examined the body, with Mr. Evans, on the following day (February 18th).

The muscular development greater than usual. On opening the chest the cellular tissue around the root of the aorta was seen distended with air. The heart was very large—its weight 18 oz. The left ventricle much thickened and dilated; it would contain a small-sized fist. One of the *carneæ columnæ* as big as the little finger. A thick bony plate was seated between two of the aortic valves; and it diminished the length of one of them to four lines, so that regurgitation must have taken place into the ventricle. The ascending aorta was dilated, and the lining membrane of this vessel, throughout its whole extent, was of an intense red colour, and bony and cartilaginous

patches were deposited under the serous membrane of various sizes. The blood was fluid. I exhibited the heart and aorta at the Medical Society, of London, a few hours after they were taken from the body; and if redness, which could not be washed off, is to be considered as an indication of aortitis, a better specimen could not have been met with; but after the aorta had been in water for five days, the redness had entirely disappeared.

The other case was that of a member of our profession whom I saw several times last year; he had suffered from disease of the heart for a long time; (the case is briefly alluded to in my paper on blood-letting, page 199), he had loud bellows' sound over the base of the heart, and difficulty of breathing on exertion, or on ascending hilly ground. Before his death he had severe pleuro-pneumonia and intense pain in the epigastric region so as to lead me to suspect and hope that it might be occasioned by the passage of a gall-stone. The gentleman who performed the autopsy wrote me word, that there was general and intense pleuro-pneumonia on the left side: a small abscess also existed between the lobes of the liver, and this had discharged its contents into the peritoneal cavity. This gentleman adds, "that the serous coat of the aorta was highly inflamed, and that death had been occasioned by inflammation of the lining membrane of the heart, arteries, and veins."

I record the above cases, not as examples of aortitis, but rather as warnings to those who are apt to confound redness of the aorta, arising from a peculiar condition of the blood, with arteritis.

As regards the treatment of this disease I have nothing to add to my former statement, (page 30), except again to express my ignorance of any mode by which the affection can be diagnosed: but whether the symptoms mentioned depend upon inflammation of the lining membrane of the aorta, of the semilunar valves, or of the endocardium, I believe that the treatment recommended will be quite as applicable.

Chronic Aortitis.—In speaking of the morbid conditions of arteries, I have alluded to the cartilaginous and bony state of the aorta, combined with redness of the internal coat, which is sometimes met with in subjects under fifty years of age. Table of cases—9, 10, 41, 59, 60, 62, 86, 92. It is, I think, probable that some of the throbbing pains which are so common along the course of the left side of the spine, owe their origin to this chronic form of aortitis which differs from the cretaceous and bony infiltrations, the result of old age. The formation of the latter deposits is probably unattended with pain. I could relate several cases where I have suspected pain in the back and increased action of the heart to depend upon chronic aortitis, but the narration of one will suffice for illustration.

Mrs. B., æt. 36, consulted me, March 26, 1851, in consequence of pain in the back along the upper and left side of the spinal column which she has had at intervals for the last two years; she has been subject to chronic rheumatism, and her occupation (the landlady of an inn) has compelled her to lead a very active life. The impulse of the heart is greater than usual, and its first sound prolonged; on applying the stethoscope over the back where she complains of pain and throbbing, no abnormal sound is heard. She has occasionally had numbness of the arm, and a disposition to syncope. On the application

of a belladonna plaister to the cardiac region, counter irritants along the spine, mild mercurials at bed-time, and small doses of colchicum for a short time, the symptoms improved. I was again requested to see her in August last, when she was suffering from the same symptoms. I mention this case as one that may, I think, depend upon a chronic inflammation of the aorta, although the evidence, I admit, is purely hypothetical. The pain in the back and in the cardiac region is not of the character of that which frequently attends liver and stomach derangements, nor do the symptoms warrant the belief that these organs are out of order. There is sometimes, in persons of this age, great change of structure in the coats of the aorta; but at present we have no proof that these lesions are accompanied by pain. The matter for future pathologists to decide is, whether many pains in the back, which are generally supposed to be rheumatic, or to arise from chilopoeitic disorder, are not occasioned by chronic aortitis?

Acute Inflammation of the Arteries of the Extremities.

My Essay on this subject (*Lancet*, May, 1841) was the first that appeared in this country on the connexion of dry gangrene with acute arteritis. I take no credit to myself for the circumstance, as I only followed in the wake of Dupuytren, and other French surgeons, who had before investigated the pathology of this form of gangrene; but I again mention the fact for the reason I have stated in my introduction to this Appendix. My object will now be to allude to such practical matter as will tend to the farther elucidation of this subject. I refrain from relating more cases in detail, as I think the pathological evidence I have already adduced is sufficient.

I will only speak of one of my former cases (case 1, p. 37), that of the girl whose leg I amputated in 1835 for dry gangrene. Since the last report, October, 1845 (page 45), she has been in a good state of health, but she is now much stouter than before. The heart's impulse is rather increased, and the first sound a little prolonged; no abnormal *bruit* is heard in the cardiac region. No pulsation can be felt in the left brachial and radial arteries, and it is very feeble in the right. When last examined pulsation was also absent in the right popliteal and tarsal arteries. In cold weather she has great difficulty in keeping the extremities warm. She is able to take long walks, although the wooden leg, of course, is some hindrance to her doing so. I need scarcely comment again on this case, more than to repeat that the plugging of the arteries from arteritis becomes now more than probable. No well authenticated instance can be adduced of the occurrence of non-pulsation in an artery, without a mechanical cause; and there is no evidence to show that an artery possesses any power independent of the heart. The increased action of arteries so constantly spoken of, and taught in our schools, does not arise, I believe, from any contractile power in the artery.

I have not said that every case of *dry* gangrene is produced by arteritis; but I say that, in every case that I have examined, I have found evidence of its existence; and in the great majority of those cases in which the disease has been attributed to other causes, the arteries have not been *carefully* inspected. The morbid anatomy of the arteries and veins, as I have several times remarked, is more

neglected than any department of pathology; and I mention the two following cases, which I heard related at the Pathological Society of London, February 5, 1850, as illustrations. They are published in the Transactions for 1850, pp. 233, 251. I give them much abbreviated. Dr. Bence Jones exhibited two masses of fibrine, taken from the knee-joint of a strong healthy-looking maid-servant, æt. 21, who died in St. George's Hospital, of acute rheumatism. Besides the joint affection there was pain in the chest, and a soft murmur over the base of the heart, towards the left clavicle. Symptoms of *delirium tremens* came on; laudanum was given; the pupils were contracted; a state of coma succeeded the excitement; and the patient died apparently from exhaustion. The condition of the brain was normal. The pericardium contained about two ounces of serum. There was a slight roughness on the surface of one auricle. The valves of the heart normal; and those of the arteries free from fibrinous deposit. The synovial membrane of both knee-joints was inflamed; and the joint contained two thickish masses of fibrine.

Mr. P. Hewett, on the same evening, exhibited the kidneys of a woman, æt. 53, who died in St. George's Hospital. She had comminuted fracture at the middle third of the leg, from a fall in the street. Gangrene of the foot and leg took place on the fourth day; amputation was performed, as no apparent disease (Mr. Hewett says) was present in the heart or main arteries of the limb. In forty-eight hours the stump began to slough, and death took place on the following evening. Dissection of the limb *removed*, showed the vessels were healthy and pervious, but the kidneys were found larger than natural; their cortical substance was coarse and congested, and the tubuli, when seen under the microscope, were most of them crammed with cells and granular matter. Mr. Hewett believed that the gangrene was occasioned by the state of the kidneys. I shall not stop to enquire whether gangrene is likely to be produced by such means? I allude to these cases because they appear to me to bear upon the question at issue, viz., the neglect of arterial inspection, even by some ardent cultivators of morbid anatomy. Mr. Hewett, in the course of the discussion, admitted that the upper part of the femoral and iliac arteries had not been examined; and Dr. Jones said no inspection of the aorta had been made in his patient. Now, in the one case aortitis may have existed; in the other, plugging of the iliac arteries? The curious example of dry gangrene in a child, only three years old, related by Mr. Solly, in the Medico-Chirurgical Transactions, 1840, is considered by many to have been unconnected with arteritis; and Mr. Solly remarks, "he is at a loss to account for the gangrene, there being little or no alteration in the arteries." But Mr. Bury, who first examined the child, says, "the femoral arteries were remarkably shrunk, very pale, and not patulous, on division with the knife."

I scarcely need revert to the error of Dr. Carswell and others, who supposed that this disease was confined to the old; nor need I comment on the inappropriateness of the term "*senile gangrene*." Dr. Hecker, of Stuttgart, published a small treatise, which had before escaped my notice, "On the Nosological and Therapeutical Researches on Gangrene, from Obstruction to the Circulation of the Blood." In a table of 69 cases collected by him, 27 only were females. In 67 of

the cases, where the age had been recorded, one occurred between the age of 1 and 10 years; six between 10 and 20; seven between 20 and 30; nine between 30 and 40; one between 40 and 50; twelve between 50 and 60; nineteen between 70 and 80; eight between 80 and 90; and one between 90 and 100. Of the above, 43 recovered, and 26 died.—*British and Foreign Medical Review*, vol. xiv. 1842.

I could quote cases in abundance, to illustrate the opinion I have before expressed respecting the nature of this disease, but I will only briefly mention a few of the most remarkable.—1. A girl, æt. 27, was admitted into the Leeds' Infirmary, May, 1845, under Mr. Teale, with dry gangrene of the leg and foot, of which she died. "The femoral artery, at its commencement, presented an annular contraction, as if it had been embraced by a ligature, and its cavity at this part was completely obliterated."—*Provincial Journal*, 1845.—2. In the remarkable case published in the same Journal, 1846, by Mr. Drayman, the boy was only ten years old, and although the hands, feet, nose, lips, and ears, were affected, he lived fourteen months. An examination of the body could not be obtained.—3. Mr. Cooper, at the Norwich Pathological Society, mentions the case of a girl, æt. 10, who, after severe pain in the foot, was affected with dry gangrene, for which the leg was successfully amputated. There was no pulsation in the femoral and popliteal arteries. Mr. Johnson, in commenting upon this case, attributed the gangrene to arteritis, and spoke of examples of this kind, in which he had found the antiphlogistic treatment successful.—*Provincial Journal*, 1848.—4. Mr. Bottomley's case, alluded to in the *Medical Examiner* (Vol. II., p. 152), is one of great interest. A man, æt. 53, in running down a hill, thought he felt something give way in his leg; pain and dry gangrene of the foot occurred soon after this; pulsation was absent in the popliteal artery, and it was very faint in the femoral. Spontaneous amputation, to a partial extent, took place, and the patient did well.—5. A man, æt. 38, died under the care of Mr. Clark, in St. Thomas's Hospital, February, 1850, of dry gangrene of the foot, which came on after rigors and erratic pains in the joints. "The lower part of the popliteal artery and the posterior tibial, for half an inch below the origin of the femoral, were filled with firm, contracted coagula, in all parts adherent to the lining membrane of the artery."—*Lancet*, 1850.—6. Dr. T. Thompson attended a woman, æt. 52, affected with phthisis, who died of gangrene of the hand and arm, which was preceded by pain in the limb. Some doubt existed as to the presence of pulsation in any of the arteries of the extremity soon after the discolouration commenced; but on the fifth day pulsation was entirely absent an inch below the clavicle. Various coagula were found, but a roll of fibrine three inches long extended from the origin of the subclavian; it was closely adherent to the aorta at one point, and when torn from this attachment a portion remained fixed to the artery. *Tran. of the London Pathological Society* 1851, p. 85.—7. Dr. Aran narrates an example of dry gangrene of the leg in a man æt. 71, in which the external iliac artery was found obliterated by a hard fibrinous clot, adherent to the inner coat of the vessel. *Gazette des Hôpitaux* 1851, p. 432.—8. A girl æt. 19, who was under the care of Dr. Wilmot had intense and burning pain in the great toe succeeded by dry gangrene; she lost two of her toes,

and after this recovered. This case Dr. Wilmot considered one of arteritis, but in another case which he relates, the subject of it a pensioner fifty years of age, the disease is thought to have arisen from ossification of the arteries; but, judging from Dr. Wilmot's narrative, I am at a loss to discover any evidence of this? *Dublin Journal*, vol. 9, 1850.—9. Dr. Fuller read a case of spontaneous gangrene at the London Medico Chirurgical Society in 1847. A woman æt. 37, was seized with most acute pain in the right foot with excessive tenderness of the integuments. After a few days both lower extremities became gangrenous, and she died five weeks from the time of seizure. The arteries are reported to have been free from inflammatory action, but the lower part of the abdominal aorta, the arteries given off below the superior mesenteric, and the arteries of the affected limbs, together with their corresponding veins, were blocked up with firm fibrinous coagula, which were in a great measure discolored and slightly adherent to the internal coat of these vessels. The kidneys were granular, and the urine albuminous. *Lancet*, 1847.

Dr. A. De Martino (*Annali Universali di Medicina*, 1848, vol. xxx.) thinks "that dry gangrene does not arise from the obstruction of the large arteries alone, but that the blood in the capillary vessels of the part is in a state of stagnation and dryness, and this he attributes to innervation. In forming these conclusions he has been assisted by microscopical examinations." But it must be apparent to all, that if the main artery of a limb is obstructed from any cause, or if the *vis a tergo* is not sufficient to propel the blood, that stagnation must be the result. I believe, in every species of gangrene, the circulation is more or less obstructed, and as I have before said, when the main artery, and the collateral branches are closed, the effect is, the death of the parts below, as shown in the black, dry, and shrivelled state of the limb.—That the varieties of spontaneous or dry gangrene depend upon the condition of the heart, and the amount of local obstruction in the artery—that this increased action of the arteries of the part spoken of by Professor Syme, and many modern writers, depends upon the obstruction, and upon the reaction of the blood; and not upon any independent power of the artery.

In many cases of dry gangrene, the artery is said to have been free from inflammation even when the clot was adherent to the serous coat, but we know that the vessels of the cornea and other parts, which in their normal condition carry white blood, may, when inflamed, be distended with red corpuscles, and no trace of the congestion or inflammation be found after death. In other instances, we can only judge of the previous existence of inflammation by its effects.

Treatment.—I have nothing to add to the opinions already expressed at page 35, but I would endeavor especially to impress upon the practitioner, the importance of having recourse to *early* antiphlogistic treatment in this disease when the symptoms are of an active character, and to divest his mind of the fashionable dogmas of the day, "that bleeding is necessarily a debilitating process, and that dry gangrene depends upon a want of constitutional power." Mr. Syme in his *Pathology and Practice of Surgery*, 1848, advocates the same treatment he recommended in 1841, although he says, the highest surgical authority in the southern metropolis (Sir B. Brodie) is still

in favor of nourishment and stimulation. I terminate this part of my subject with a quotation from a clinical lecture, delivered by Mr. Teal at the Leeds Infirmary, 1845:—"The value of the treatment, recommended by M. Dupuytren, I have had repeated opportunities of verifying. Frequently have I witnessed, even in aged subjects, most evident and immediate relief of pain from the abstraction of a few ounces of blood, when opiates, stimulants, and tonics, had proved unavailing; and by the same treatment I have not unfrequently seen threatened gangrene averted, and existing gangrene arrested in its progress. But I need scarcely tell you, that in adopting this moderate antiphlogistic treatment, regard must be had to the condition of the patient. If the skin be of somewhat higher temperature than natural, the cheeks flushed, the pulse not deficient in force, although the patient be advanced in years, and apparently much shattered by the disease, the repeated abstraction of small quantities of blood may be employed with safety and advantage; but if the powers of life be flagging, as in the case which you have lately witnessed, we have no alternative but to endeavor, by the use of stimulants and cordials, to prolong life for a brief period."

Gangrene from disease of the Heart or Blood.

Although John Hunter said that blood would not coagulate in a healthy artery, it is not improbable that gangrene is sometimes produced by disease of the heart, combined with an abnormal condition of the circulating fluid; but whether the clot be caused by inflammation of the artery, or by disease of the heart and blood, the effect is nearly the same. In the latter cases however, the veins are generally obstructed by coagula, and the limb does not present the dry, shrivelled appearance, that it does in gangrene from arteritis, and the pain too is generally less severe.

Mr. Clark, of Devizes, in the Medical Gazette, 1837, relates the case of a woman, æt. 50, who, when in a profuse perspiration, placed her right heel on a damp brick floor, this was followed, after twelve or fourteen hours, by severe pain in the foot, darting upwards to the thigh, and attended with coldness of the limb. The pulse was extremely irregular in frequency. The limb, in two days, became of a leaden hue, and pulsation was absent in the posterior tibial, and popliteal arteries, and it was very slight in the femoral. The thigh, on the sixth day, was considerably enlarged, but without any symptoms of inflammation; decomposition advanced rapidly in the leg, and death took place eight days from the commencement of the attack. The heart was very large, the left auricle double its natural size, and the mitral valves cartilaginous at their edges. The femoral artery gradually tapered until its cavity became obliterated above the part where the sloughing commenced; the coats healthy. Although this is described as a case of gangrene from disease of the heart, I think it may fairly be asked whether the exposure to cold did not occasion arteritis, which rapidly extended upwards to the femoral artery? A case of gangrene of the extremities is recorded in the *Dublin Journal*, vol. x., 1850, by Dr. Power, which appeared to depend upon disease of the mitral valve. A collier, æt. 42, affected with disease of the heart, and also subject to rheumatism, after exposing his legs to cold, felt a numbness in the legs

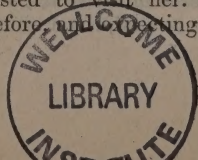
and toes; in a few days both limbs were gangrenous (not dry gangrene.) The heart was much diseased, and may be seen in the Museum of the Dublin Richmond School of Medicine. The popliteal, and the anterior and posterior tibial arteries contained coagula, but they were not adherent to the vessel.—Professor Schutzenberger, *Gazette Médicale de Paris*, 1847, p. 612, narrates a case of arrest of the circulation from the same cause. “The feet were black and œdematous. The patient was of a rheumatic diathesis, and only 24 years of age. The mitral valve would scarcely admit the end of the fore finger; both iliac arteries, as well as the veins, contained coagula.” I had an opportunity of seeing the following remarkable case in August last, with my friend Mr. Richardson, of Mortlake, who has kindly furnished me with the undermentioned history.—

“Mrs. B., æt. 26. This patient states that she first became ill in 1848. She is a dress maker by occupation; is tall, pale, and emaciated. Previous to her illness she had been subjected to bad treatment from her husband. When first indisposed in 1848, she complained most of lowness of spirits, with fits of feverish excitement, and frequent palpitations of the heart. One evening on getting into bed she felt a sensation of pain in the feet, and on looking at them she said, that they were swollen and red. For this she was put under medical treatment and she soon recovered. The only immediate cause for this attack which the patient can name is, that she had been using a foot-bath of hot water with mustard, on the evening previous to the appearance of the symptoms.

From the period above named, until the month of November, 1850, she continued debilitated and had some slight returns of the pain and swelling in the feet. After this date the symptoms were more frequent and severe. On the 28th of February, 1851, she first came under my care. I found her in a most deplorable condition; an enfeebled heart was acting with a rapidity such as I have rarely seen. The feet were swollen, and the tips of the toes were gangrenous; the pain seemed intolerable; the superficial veins of the legs were large, and the circulation through them seemed remarkably impeded. The heat of the surface of the body was low but uniform, and all the secretions were natural.

My opinions as to the cause of this gangrene were divided. The palpitations naturally led me to the heart, but what state of the heart could exist to lead to it? were there on the valves warty vegetations, and were portions of these being removed by the circulating currents, and being carried round in the course of the vessels, thus plugging up the minute arterial branches, or the capillary system? or was there a fibrinous concretion in the heart, undergoing the same process? At first I inclined to the latter opinion. I prescribed mercury with morphia, and to my surprise, as the system came under the influence of the mercurial, the symptoms entirely passed off, the pain ceased, the gangrene disappeared, nourishing food was borne, and recovery so far took place that the patient was enabled to resume her ordinary occupation, coldness of the feet only remaining.

I heard no more of this woman for three months, when I was one day again requested to visit her. I found her suffering from the palpitations as before, and expecting an attack at the feet. In this



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of known medical examination
boarded.

complete. "Where comes"

it was boarded April 1852.

